LIBRARY OF
COLLEGE OF OSTEOPA
PHYSICIANS & SURGE

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/casehistoriesinp00morsiala

THE
CASE HISTORY SERIES

CASE HISTORIES IN MEDICINE

BY

RICHARD C. CABOT, M.D.

Second edition, revised and enlarged

CASE HISTORIES IN PEDIATRICS

BY

JOHN LOVETT MORSE, M.D.

Second edition, revised and enlarged

ONE HUNDRED SURGICAL PROBLEMS

BY

JAMES G. MUMFORD, M.D.

CASE HISTORIES IN NEUROLOGY

BY

E. W. TAYLOR, M.D.

CASE HISTORIES

IN

PEDIATRICS

A COLLECTION OF HISTORIES OF ACTUAL PATIENTS SELECTED TO ILLUSTRATE THE DIAGNOSIS, PROGNOSIS AND TREATMENT OF THE DISEASES OF INFANCY AND CHILDHOOD, WITH AN INTRODUCTORY SECTION ON THE NORMAL DEVELOPMENT AND PHYSICAL EXAMINATION OF INFANTS AND CHILDREN

BY

JOHN LOVETT MORSE, A.M., M.D.

Associate Professor of Pediatrics, Harvard Medical School; Associate Visiting Physician at the Infants' Hospital and at the Children's Hospital, Boston.

SECOND EDITION

LIBRARY OF COLLEGE OF OSTEOPATHIC PHYSICIANS & SURGEONS

BOSTON

W. M. LEONARD, PUBLISHER

1913

WS200
M885c
1913

Copyright, 1913,
By W. M. Leonard.

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE AND SURGERY
LIBRARY

TO

THOMAS MORGAN ROTCH, M.D.,

THE FATHER OF PEDIATRICS IN NEW ENGLAND,

THE ORGANIZER OF

THE DEPARTMENT OF PEDIATRICS

IN THE

HARVARD MEDICAL SCHOOL

AND THE

FOUNDER OF MODERN SCIENTIFIC INFANT FEEDING.

126
1713

PREFACE TO THE FIRST EDITION

THE author has found this method of case teaching so useful in the instruction not only of undergraduates but also of graduate students, who, although older and wiser than in their undergraduate days, are still students in the best and widest sense, that he felt that there was need for the utilization of this method for the presentation of the subject of pediatrics to the practitioner.

Case teaching, which had been in use for a number of years in the Harvard Law School, was introduced into the Harvard Medical School in 1900 at the suggestion of Prof. W. B. Cannon, then a student in the school. The author believes that this method of teaching is far superior to recitations, quizzes, and conferences. One of its greatest advantages is that it compels the student to think for himself. It is almost as valuable as the clinical lecture, in which the patient is shown, and, except in special instances, is more instructive than the didactic lecture. It is surpassed only by bedside instruction to small groups of students.

PREFACE TO THE SECOND EDITION

THE number of case histories has been doubled in this edition in order to cover the subject of Pediatrics more fully. An introductory section on the Normal Development and Physical Examination of Infants and Children has been added, because it was believed that the readers would be able to study and analyze the cases better, if they were familiar with the normal development and methods of examination. Several reviewers of the first edition found fault because the diagnosis was not given at the head of each case, not realizing, apparently, that it was omitted in order that the reader might study it out for himself. The main object of the book is to present a series of problems to be solved by the reader. This object would be defeated, if the diagnosis was given in the beginning. Several reviewers have complained that there was nothing to show whether or not the diagnoses and prognoses were correct. It never occurred to the writer that any one would suppose that they were not. Consequently, nothing was said about it. As a matter of fact, the diagnoses are correct in every instance in which a positive diagnosis is made. In a few, in which a probable diagnosis only is made, the children are still alive. The prognoses are all absolutely correct, except in a few chronic cases in which, the children being still alive, it is impossible to give exact data as to the duration of life. The treatment recommended in the text was that actually employed.

TABLE OF CONTENTS

		Page
The Normal Development and Physical Examination of Infants and Children		11-62
Diseases of the New-born.		
Case 1.	Prematurity	63
2.	Cystic Hygroma of the Neck	66
3.	Congenital Malformation of the Intestine	68
4.	Congenital Obliteration of the Bile Ducts	70
5.	Encysted Hydrocele of the Cord	72
6.	Cephalhematoma	74
7.	Obstetric Paralysis	76
8.	Hematoma of the Sternocleidomastoid Muscle	79
9.	Congenital Atelectasis	81
10.	Congenital Laryngeal Stridor	84
11.	Congenital Malformation of the Esophagus	86
12.	Physiological Engorgement of the Breasts	89
13.	Icterus Neonatorum	90
14.	Sclerema Neonatorum	92
15.	Granuloma of the Navel	94
16.	Prolapse of Meckel's Diverticulum	96
17.	Hemorrhagic Disease of the New-born	98
18.	Hemorrhagic Disease of the New-born	102
19.	Septic Infection of the New-born	105
20.	Omphalitis and Septic Infection of the New-born	108
21.	Septic Infection of the New-born	110
22.	Erysipelas of the New-born	112
Diseases of the Gastro-enteric Tract.		
Case 23.	Organic Stricture of the Esophagus	118
24.	Spasm of the Pylorus	121
25.	Infantile Pyloric Stenosis	124
26.	Nervous Vomiting	127
27.	Recurrent Vomiting	129
28.	Acute Gastric Indigestion	133
29.	Chronic Gastric Indigestion	136
30.	Chronic Gastric Indigestion	140
31.	Congenital Dilatation of the Colon	143
32.	Intussusception	146
33.	Intussusception	149
34.	Intussusception	152
35.	Incontinence of Feces	155
36.	Constipation	157
37.	Constipation of the Spasmodic Type. Fissure of the Anus	160
38.	Acute Duodenal Indigestion	163
39.	Acute Duodenal Indigestion	166
40.	Chronic Duodenal Indigestion	168
41.	Acute Intestinal Indigestion of the Fermentative Type	171
42.	Chronic Intestinal Indigestion	174
43.	Chronic Intestinal Indigestion	177
44.	Chronic Intestinal Indigestion	181
45.	Intestinal Indigestion from an excess of Proteids in the Breast Milk	185
46.	Acute Gastric and Intestinal Indigestion	187
47.	Indigestion from an Excess of Fat in the Food	189

DISEASES OF THE GASTRO-ENTERIC TRACT (*Continued*). PAGE

Case 48. Indigestion from an Excess of Proteids in the Food 192
49. Appendicitis 195
50. Appendicitis 198
51. Infectious Diarrhea 201
52. Cholera Infantum 204
53. Pin-worms 206
54. Round Worms 208
55. Tape Worm 210

DISEASES OF NUTRITION.

Case 56. Malnutrition from an Insufficient Supply of Food 213
57. Malnutrition from an Insufficient Amount of Proteid in the Food 217
58. Malnutrition from an Insufficient Amount of Breast Milk . . . 220
59. Rickets. Atelectasis of the Lung 223
60. Rickets and Secondary Anemia 226
61. Late Rickets 230
62. Scurvy 234
63. Scurvy 238
64. Infantile Atrophy 240

SPECIFIC INFECTIOUS DISEASES.

Case 65. Tubercular Peritonitis 243
66. Tubercular Peritonitis 247
67. Tubercular Peritonitis 250
68. Pulmonary Tuberculosis 253
69. Pulmonary Tuberculosis 255
70. Pulmonary Tuberculosis 257
71. Chronic Diffuse Tuberculosis 259
72. Tubercular Meningitis 262
73. Tubercular Meningitis 266
74. Tubercular Meningitis 269
75. Cerebrospinal Meningitis 272
76. Cerebrospinal Meningitis 275
77. Typhoid Fever 278
78. Typhoid Fever 281
79. Typhoid Fever with Enlargement of the Mesenteric Glands . . 284
80. Diphtheritic Rhinitis 287
81. Laryngeal Diphtheria 289
82. Influenza 292
83. Malaria 294
84. Periosteitis. Osteomyelitis. 296
85. Periosteitis and Osteomyelitis 298
86. Syphilitic Rhinitis 300
87. Syphilitic Epiphysitis 304
88. Syphilitic Osteoperiosteitis 307
89. Chicken-pox 310
90. Measles 312
91. German Measles 314
92. Scarlet Fever 317
93. Scarlet Fever 320
94. Mumps 323
95. Whooping-cough 325

DISEASES OF THE NOSE, THROAT, EARS AND LARYNX.

Case 96. Adenoids 329
97. Adenoids 331
98. Catarrhal Laryngitis 333
99. Retropharyngeal Abscess 335
100. Laryngismus Stridulus 338
101. Otitis Media 341
102. Otitis Media 344
103. Otitis Media 346

DISEASES OF THE BRONCHI, LUNGS AND PLEURÆ. PAGE

Case 104. Bronchitis 349
105. Bronchitis 351
106. Bronchitis 353
107. Foreign Body in Bronchus 355
108. Asthma 357
109. Asthma 360
110. Bronchopneumonia 363
111. Bronchopneumonia 366
112. Pneumonia 369
113. Pneumonia 372
114. Pneumonia 376
115. Serous Pleurisy 379
116. Purulent Pleurisy 383
117. Encapsulated Empyema 387
118. Interlobar Empyema 390
119. Pneumothorax 394
120. Sarcoma of the Lung and Liver 396

DISEASES OF THE HEART AND PERICARDIUM.

Case 121. Congenital Heart Disease 399
122. Congenital Heart Disease 402
123. Congenital Heart Disease 404
124. Functional Heart Disease 407
125. Acute Endocarditis 410
126. Malignant Endocarditis 413
127. Chronic Valvular Disease of the Heart 416
128. Myocarditis 419
129. Pericarditis with Effusion 422
130. Pericarditis with Effusion 425
131. Chronic Adhesive Pericarditis 429

DISEASES OF THE LIVER.

Case 132. Fatty Liver 433
133. Cirrhosis of the Liver 436
134. Malignant Disease of the Liver 439

DISEASES OF THE KIDNEYS AND BLADDER.

Case 135. Orthostatic Albuminuria 441
136. Hematuria 444
137. Acute Nephritis 446
138. Pyelitis 452
139. Pyelitis 455
140. Sarcoma of the Kidney 457
141. Chronic Parenchymatous Nephritis 459
142. Nocturnal Enuresis 462

DISEASES OF THE BLOOD.

Case 143. Secondary Anemia 465
144. Secondary Anemia 468
145. Secondary Anemia with Splenic Tumor 471
146. Pernicious Anemia of the Aplastic Type 475
147. Lymphatic Leukemia 479
148. Lymphatic Leukemia 482
149. Anemia with Splenic Tumor 484
150. Pseudoleukemia 488
151. Banti's Disease 491

DISEASES OF THE NERVOUS SYSTEM.

Case 152. Habit Spasms 495
153. Pavor Nocturnus 498
154. Epilepsy 500

Diseases of the Nervous System (*Continued*). Page

Case 155. Epilepsy. Chorea 503
156. Reflex Convulsions 507
157. Pseudomasturbation 510
158. Microcephalic Idiocy 513
159. Amaurotic Idiocy 515
160. Mongolian Idiocy 518
161. Chronic Internal Hydrocephalus 521
162. Chronic Internal Hydrocephalus 524
163. Chronic Internal Hydrocephalus 527
164. Tetany 530
165. Cerebral Hemorrhage 533
166. Cerebral Paralysis 536
167. Influenza Meningitis 538
168. Pneumococcus Meningitis 540
169. Serous Meningitis 542
170. Encephalitis 544
171. Infantile Paralysis 548
172. Infantile Paralysis 550
173. Infantile Paralysis 553
174. Diphtheritic Paralysis 556
175. Erb's Paralysis 558
176. Cerebellar Tumor 561
177. Hysterical Paralysis 564
178. Sarcoma of the Brain and Skull 566
179. Amyotonia Congenita 568

Unclassified Diseases.

Case 180. Sporadic Cretinism 571
181. Enlargement of the Thymus 574
182. Enlargement of the Thymus 578
183. Status Lymphaticus 581
184. Cervical Adenitis 585
185. Bronchial Adenitis 588
186. Purpura 591
187. Idiopathic Dropsy 595
188. Idiopathic Dropsy 598
189. Angioneurotic Edema 601
190. Erythema Multiforme 604
191. Antitoxin Poisoning 606
192. Diabetes Mellitus 608
193. Diabetes Mellitus 611
194. Diabetes Insipidus 614
195. Osteogenesis Imperfecta 617
196. Still's Disease 619
197. Acute Arthritis of Infants 623
198. Difficult Dentition 625
199. Noma 627
200. Cyst of the Mesentery 629

SECTION I.

THE NORMAL DEVELOPMENT AND PHYSICAL EXAMINATION OF INFANTS AND CHILDREN.

A CAREFUL and complete physical examination is of even greater value in diagnosis in early life than in adult life, because the baby and young child can tell little or nothing as to their subjective symptoms. In fact, except in the diseases of the gastroenteric tract, the diagnosis must be made almost entirely on the findings of the physical examination. It is, moreover, easy to misinterpret these findings, unless the normal development at different ages is known, because what is normal at one age is abnormal at another. Unless due attention is paid to these differences, mistakes are almost certain to arise. While the methods of examination employed are the same at all ages, the relative value of these methods varies with the age of the patient, and due allowance must be made for these differences. These methods also have to be modified in many ways before they are applicable to infants and young children. The attempt has been made in the following pages to give the chief points in relation to the normal regional anatomy and development of children and to describe the proper methods of examination.

Growth in Height and Weight. The rate of growth is very rapid in the beginning, especially in the first year. It is still rapid, but less so, up to six years. It is then comparatively slow until the prepubertal acceleration, which begins in girls at about eleven years and in boys at about thirteen years, and lasts several years.

The rate of growth in height and weight are not synchronous during childhood, but show marked seasonal differences. Growth in height is most rapid during the spring and the first half of the summer and is often associated with an actual

loss of weight. It is least rapid during the latter part of the summer and autumn. Growth in weight is most rapid during the late summer and autumn and least rapid during the late spring and early summer. In fact, there is often a loss of weight during this period which is equal to, or greater than, the gain during the winter and early spring.

Growth during First Five Years. The average weight of American babies at birth is between seven and seven and one-half pounds, the boys averaging a little heavier than the girls. The average length of American babies at birth is about twenty and one-half inches, the average length of the boys being somewhat greater than that of the girls. There are numerous statistics as to the rate of growth during the first two years, but very few as to that during the next three years. The average growth in length during the first year is eight inches, and during the second year four inches. In general, the birth weight is doubled at five months and nearly trebled at a year. The only reliable figures as to the rate of growth of American children during the third, fourth and fifth years are those of Holt (Diseases of Infancy and Childhood, 1906, p. 20) which are based on observations on between 375 and 500 children. They are given in the following table.

TABLE I. — GROWTH IN HEIGHT AND WEIGHT DURING FIRST FIVE YEARS.

Age.	Height.				Weight.			
	Boys.		Girls.		Boys.		Girls.	
	Inches.	Cm.	Inches.	Cm.	Pounds.	Kg.	Pounds.	Kg.
Birth	20.6	52.5	20.5	52.2	7.55	3.43	7.16	3.26
1 year	29.0	73.8	28.7	73.2	20.5	9.29	19.8	8.84
2 years	32.5	82.8	32.5	82.8	26.5	12.02	25.5	11.56
3 years	35.0	89.1	35.0	89.1	31.2	14.14	30.0	13.60
4 years	38.0	96.7	38.0	96.7	35.0	15.87	34.0	15.41
5 years	41.7	106.0	41.4	105.3	41.2	18.71	39.8	18.06

The heights and weights in this table are net; *i.e.*, without shoes or clothes.

Growth from Five to Fifteen Years. There are several large series of observations as to the growth of American children after the first five years. Boas (Science, 1895, N. S., Vol. 1, p. 402) has calculated a table of heights from all the

available American material, comprising 45,151 boys and 43,298 girls, while Burk (American Journal of Psychology, 1897–8, Vol. 9, pp. 262–3) has calculated one of weights from about 68,000 children. Their results are combined in the following table.

TABLE II. — GROWTH IN HEIGHT AND WEIGHT FROM 5 TO 17 YEARS.

Age at last birthday.	Height.				Weight.			
	Boys.		Girls.		Boys.		Girls.	
	Inches.	Cm.	Inches.	Cm.	Pounds.	Kg.	Pounds.	Kg.
5 years	41.7	105.9	41.3	104.9	41.0	18.6	39.6	18.0
6 years	43.9	111.5	43.3	110.1	45.2	20.5	43.4	19.7
7 years	46.0	116.8	45.7	116.0	49.5	22.5	47.7	21.6
8 years	48.8	123.9	47.7	121.1	54.5	24.7	52.5	23.8
9 years	50.0	127.0	49.7	126.2	59.6	27.0	57.4	26.0
10 years	51.9	131.8	51.7	131.3	65.4	29.5	62.9	28.5
11 years	53.6	136.1	53.8	136.6	70.7	32.1	69.5	31.5
12 years	55.4	140.7	56.1	142.4	76.9	34.9	78.7	35.7
13 years	57.5	146.0	58.5	148.5	84.8	38.5	88.7	40.3
14 years	60.0	152.4	60.4	153.4	95.2	43.2	98.3	44.6
15 years	62.9	159.7	61.6	156.4	107.4	48.8	106.7	48.5
16 years	64.9	164.8	62.2	157.9	121.0	55.0	112.3	51.0

The heights in this table are without shoes.

The weights are with indoor clothes. These make up for boys approximately 8%, and for girls 7%, of the gross weight.

The term, "age at last birthday," is liable to give a wrong impression, because the figures given are really average figures taken from all the children from that birthday to the next. A more accurate term is the succeeding half-year, *i.e.*, 5½ years instead of 5 years, the age at the last birthday.

Relative Growth of Extremities and Trunk. It is well known that at birth the legs make up a much smaller proportion of the total length of the body than they do in the adult. There are, however, very few observations as to the relation between the length of the legs and that of the body at different ages. Holt (Diseases of Infancy and Childhood, 1906, p. 21) states that the distance from the anterior superior spine of the ilium to the sole of the foot is 43% of the total length at birth, 54% at five years, and 60% at sixteen years. Vierordt (Gerhardt's Handbuch der Kinderkrankheiten, Vol. 1, p. 77) quotes Zeising to the effect that the distance from the crest of the ilium to the sole of the foot is at birth 50% of the total length of the body, 52.2% at one year,

54.3% at two years, 56.1% at three years, 58.5% at five years, 60.3% at eight years, 61.8% at thirteen years and 63.1% at sixteen years.

Head. The head is relatively large at birth, its circumference being greater than that of the chest. It increases in size very rapidly during the first year. The rate of growth then becomes progressively slower and is very slow after five years. Excepting in rare instances, such as marked hydrocephalus, the absolute size of the head is of less importance in determining whether the head is of normal size or not than the relation between that of the head and chest. The chest grows faster than the head and surpasses it in size sometime during the third year. The following table, copied from Holt (Diseases of Infancy and Childhood, 1906, p. 20), shows the relations between the head and chest at different ages.

TABLE III. — CIRCUMFERENCE OF HEAD AND CHEST.

Age.	Head.				Chest.			
	Boys.		Girls.		Boys.		Girls.	
	Inches.	Cm.	Inches.	Cm.	Inches.	Cm.	Inches.	Cm.
Birth	13.9	35.5	13.5	34.5	13.4	34.2	13.0	33.2
6 months	17.0	43.5	16.6	42.2	16.5	42.0	16.1	41.0
1 year	18.0	45.9	17.6	44.6	18.0	45.9	17.4	44.4
2 years	18.9	48.2	18.6	47.2	19.0	48.4	18.5	47.0
3 years	19.3	49.0	19.0	48.4	20.1	51.1	19.8	50.5
4 years	19.7	50.3	19.5	49.6	20.7	52.8	20.5	52.2
5 years	20.5	52.2	20.2	51.3	21.5	54.8	21.0	53.5
10 years	21.0	53.5	20.7	52.8	25.8	65.6	24.7	63.0
15 years	21.8	55.5	21.5	54.8	30.0	76.6	30.3	76.8

The circumference of the head is the occipito-frontal.
The circumference of the chest is at the level of the nipples, midway between inspiration and expiration.

Babies are usually able to hold up the head alone, if the back is supported, when they are eight or ten weeks old.

Shape of Head. Deformities resulting from compression during labor are often present at birth, but disappear within the first two to four weeks. The head is then rounded and symmetrical. Flattening of the back or side of the head from constant lying in one position is common and is easily overcome by changing the position. Marked asymmetry of the head may be present at birth. It usually disappears

during the first five or six years. The most common abnormalities in the shape of the head are caused by rickets and hydrocephalus. Those due to rickets are the result of overgrowth at the centres of ossification in the frontal and parietal bones. These overgrowths form prominences on the forehead and sides of the head which are often called "bosses." When they are large and are associated, as they usually are, with flattening of the top of the head, the so-called "square head" of rickets results. The hydrocephalic head, on the other hand, is rounded and enlarged symmetrically, while the whole forehead overhangs.

Fontanelles. The posterior fontanelle is between one-quarter and three-eighths of an inch (1 cm.) in diameter at birth. This fontanelle closes at six weeks.

The anterior fontanelle is smaller at birth than a few days later, when the head has come into shape. It is then approximately one inch (2.5 cm.) in length and seven-eighths of an inch (2.2 cm.) in width. It apparently increases somewhat in size with the growth of the head during the first six to nine months. There is some doubt, however, as to whether there really is an absolute increase in size. It then gradually diminishes in size and closes at about eighteen months. Early closure may be due to a small brain or may be an individual peculiarity. Delay in closure is usually due to rickets, but may be the result of hydrocephalus or merely an individual or family peculiarity. The level of the anterior fontanelle is that of the surrounding bones or a little below it. Bulging of the fontanelle means an increase in the intracranial pressure. When chronic this is usually due to chronic internal hydrocephalus; when acute, to meningitis. Depression of the fontanelle means a decrease in the intracranial pressure. This is usually due to a diminution in the amount of fluid in the brain as the result of general loss of fluid in diarrhea or malnutrition.

Sutures. Separation of the cranial bones after birth is abnormal, except that the frontal suture may be open in its upper part for a few days or weeks. Mobility usually persists for six months and sometimes for nine months, at which time bony union is usually fairly firm. Overlapping of the

bones at the sutures is very common in early infancy as the result of malnutrition.

Softening of the bones of the skull, craniotabes, is usually due to rickets but sometimes to syphilis. It usually appears first along the sutures, about the anterior fontanelle and in the occipital bone. The parietal bones are often involved; the frontal and temporal, relatively rarely. The best method of determining craniotabes is by placing the heels of the hands on the forehead and then pressing on the head with the tips of the fingers. Imperfect ossification of the bones of the skull at birth is a manifestation of delayed or imperfect development and is not due to rickets or syphilis.

Superficial Veins of Scalp. The superficial veins of the scalp are usually visible if the hair is not too thick. They are always enlarged in chronic internal hydrocephalus and frequently so in disturbances of nutrition, especially rickets. Enlargement of the veins of the scalp without evident cause should always suggest the possibility of syphilis.

Macewen's Symptom. Macewen's symptom is the change in the cranial percussion note as the result of certain gross changes in the intracranial contents. It is best elicited by listening, with the bell of the stethoscope placed on the middle of the forehead or over the occipital protuberance, while the skull is lightly percussed with the finger tip. The resonance is increased and somewhat tympanitic in character when there is an accumulation of fluid in the lateral ventricles and there is sometimes dullness over a tumor, if it is situated near the surface.

Hair. The first hair is sooner or later replaced by a new growth. It sometimes begins to come out in the first few weeks and sometimes is retained for several months. The new hair may come in quickly or slowly, so that some babies always have a considerable amount of hair, while others are bald for a long time. Loss of hair on the back of the head is sometimes due to rickets but is more often merely the result of too soft a pillow, of turning the head from side to side in order to see, or of lying too much in one position. Coarse hair should always suggest an insufficiency of the thyroid gland.

Face. The face is relatively small and the cranium relatively large at birth, the relation at that time being about 1 to 8, while at five years it is 1 to 4 and in the adult 1 to 2. If the part of the head below the orbital arches is designated as the face and that above them as the cranium, the relation of the face to the cranium at birth is approximately 1 to 1, and in the adult approximately 2 to 1. The shortness of the face is due principally to the rudimentary condition of the jaws and teeth. The face is relatively much broader in relation to its length at birth than in the adult, the relation of the breadth to the length at birth being as 10 to 4 and in the adult as 9 to 8.

Nose. The nose is relatively small in infancy and early childhood and the bridge rudimentary and relatively wide. It is especially wide in cretinism and Mongolian idiocy. A depression at the root of the nose in infancy is never due to syphilis, but may be in later childhood.

A nasal discharge is not uncommon in infancy and childhood. This is, in the vast majority of instances, due to a simple rhinitis and not to diphtheritic rhinitis or syphilis. A thin, irritating discharge, especially if tinged with blood, suggests diphtheritic rhinitis, while a muco-purulent or purulent discharge, especially if bloody, suggests syphilis.

Smell. It is probable that the sense of smell is present in a rudimentary condition in the newly-born. It develops slowly, however, and the ability to detect fine differences in odors is not acquired until late in childhood.

Motion of the alæ nasi in respiration points toward some disease of the respiratory tract, which is not necessarily pneumonia, as is often supposed. It is often present in infancy, however, when there is no trouble in the respiratory tract and is, therefore, of relatively little importance.

Lips. Fissures and rhagades are usually manifestations of syphilis, but may be due to malnutrition and infection from any cause.

Mouth. The examination of the mouth and throat is best left until the last, because infants and young children are often much disturbed by it. If it is done first they are very likely to become frightened and resist further examination.

The mouth is normally kept closed. An open mouth is usually due to obstruction in the nose or nasopharynx. The most common cause of this obstruction is adenoids. It must be remembered, however, that babies and young children are very likely to open their mouths, if they are interested. Idiots are also very likely to keep their mouths open.

A rounded swelling is often visible on each side of the mouth between the jaws during infancy. These swellings are the so-called "sucking pads," which are collections of fat, enclosed in a capsule, lying outside the buccinator muscles. They become much smaller after infancy, but are often visible throughout childhood.

The roof of the mouth is, as a rule, flatter in infancy than in childhood, the arching becoming more marked as the alveolar ridges develop. The normal variations in the arch of the hard palate are, however, very great. An excessive degree of arching is in most instances the result of interference with the nasal respiration, this interference usually being due to adenoids. It is sometimes, however, a stigma of degeneration. The soft palate is more horizontal in infancy than later, while the uvula is very small.

One or more small white or yellowish-white nodules are often visible in the median line of the hard palate at or near its junction with the soft palate during the early weeks or months of life. These are accumulations of epithelial cells and are known as EPSTEIN'S PEARLS. A small protuberance is often visible on each side of the soft palate. These are the tips of the hamular processes of the sphenoid bone. The mucous membrane over these processes is very thin, and, as the result of mechanical injury, erosions and ulcerations often occur in these areas. These lesions constitute the condition known as BEDNAR'S APHTHÆ, and are not manifestations of syphilis or tuberculosis, as is often supposed. Similar lesions also frequently occur over and about Epstein's pearls.

The mouth is relatively dry during early infancy, because but little SALIVA is secreted during the first three or four months. The secretion then increases rapidly in amount. A considerable proportion runs out of the mouth at first, however, because the baby does not know enough to swallow

it. When he learns how, drooling ceases. There is no etiological connection between drooling and dentition. They merely appear coincidently.

Koplik's spots, which are pathognomonic of measles, are situated on the buccal mucous membrane. They are rose-red spots, the size of the head of a pin, or somewhat larger, with a pearly white spot, the size of the point or shaft of a pin, in the centre.

Tongue. The tongue is lightly coated, especially posteriorly, during the early months. This coating is due to the fact that, owing to the deficiency of the salivary secretion, the desquamating epithelium is not washed away as it is later.

Enlargement of the tongue in infancy may be a congenital malformation, but is more often a manifestation of cretinism. The tongue is also enlarged in Mongolian idiocy in childhood, but not in infancy.

Ulceration of the under surface of the tongue at or near the frenum is not very uncommon as the result of the irritation of the lower incisor teeth or infection (Riga's or Fédé's Disease). It does not necessarily indicate whooping-cough as is sometimes taught.

Taste. The sense of taste is well developed at birth.

Teeth. Infants are sometimes born with teeth. The first tooth usually appears at six or seven months. The teeth usually erupt in groups with considerable regularity. There are so many normal variations, however, that it is difficult to lay down any hard and fast rules. In a general way the first, or temporary teeth, erupt as follows:

2 middle lower incisors,	6–8 mos.
4 upper incisors,	8–10 mos.
2 lateral lower incisors,	12–15 mos.
4 anterior molars,	
4 canines,	18–20 mos.
4 posterior molars,	24–30 mos.
20	

Delay or irregularity in cutting the teeth may be due to rickets or may be merely an individual or inherited peculiarity.

It is not wise to attribute delay in dentition to rickets, unless there are other signs of the disease present. Disturbances of nutrition, other than rickets, seldom delay dentition. They often result, however, in an imperfect development of the enamel and a tendency to early decay. Syphilis never produces any characteristic changes in the first teeth, its action being the same as that of other disturbances of nutrition. The first of the second, or permanent, teeth are the so-called "six-year old" molars, which appear at this time behind the posterior molars of the first dentition. The permanent teeth then begin to replace the temporary teeth, the bicuspids taking the place of the temporary molars, after which the permanent molars erupt posteriorly. The permanent teeth erupt in a general way as follows, the lower teeth usually preceding the upper:

4 first molars,	6 years
4 middle incisors,	7 years
4 lateral incisors,	8 years
4 first bicuspids,	9 years
4 second bicuspids,	10 years
4 canines,	12–13 years
4 second molars,	12–15 years
4 third molars,	17–25 years
32	

The permanent teeth often show, in the same way as the temporary, an imperfect development of the enamel and a tendency to early decay, if the nutrition has been disturbed during early childhood. They also show the typical lesions of syphilis, the so-called "Hutchinson teeth."

Projection of the upper teeth, like crowding together of the upper teeth, is usually the result of imperfect nasal breathing, ordinarily due to adenoids, and not of thumb-sucking as was formerly supposed.

Throat. It is impossible to obtain a satisfactory view of the throat unless the child is held properly. It must, in the first place, be held so that the light shines into its throat, that is, facing a window or a light. It should be held in the

Method of holding infant for examination of the throat.

Method of holding child for examination of the throat.

upright position; otherwise it is impossible to properly extend the head. The person that holds the child should look after the body and extremities. The examiner then holds the head with his left hand and takes the spoon or depressor in his right. If the examiner wishes to use both hands, as in taking a culture, the head also can be held by the person holding the child, or, if it is too strong to be held in this way, by a third person.

If the child refuses to open its mouth it can usually be made to do so by working the spoon or depressor in gradually from the side, by pushing it in when it cries, or by pinching the nose.

The throat cannot be properly examined unless the child is made to gag. This can be done by placing the spoon or depressor on the back of the tongue and pressing downward and forward. It is useless to press on the front or middle of the tongue. This merely pushes the back of the tongue upward and obscures the view of the throat.

Inspection of the throat is not sufficient, if there are any symptoms of obstruction to either respiration or deglutition. In such instances a digital examination of the throat should always be made, as it is perfectly possible to miss a retro-pharyngeal abscess if reliance is placed on inspection alone. A gag should never be used when the presence of a retro-pharyngeal abscess is suspected, because sudden death sometimes results if the jaws are widely separated in this condition.

The tonsils are relatively larger throughout childhood than in adult life and normally increase in size at the time of the eruption of the molars.

The epiglottis is visible in infancy and early childhood when the tongue is depressed and the patient made to gag.

Esophagus. The distance from the gums to the cardia in the new-born is seventeen cm. ($6\frac{3}{4}$ inches); from the incisor teeth to the cardia at three years, twenty-three to twenty-four cm. (9–$9\frac{3}{8}$ inches); and at six years, twenty-seven cm. ($10\frac{5}{8}$ inches). After swallowing a gurgling sound is normally heard at the left of the spinous processes as far

down as the eighth dorsal spine. In childhood the squirting sound of liquids passing through the cardia into the stomach is heard in the epigastrium about five seconds after swallowing.

Nasopharynx. The nasopharynx is very low at birth, but relatively long from before backward. It increases rapidly in height during the first six months, but very slowly during the rest of infancy. It changes gradually toward the adult type, but is relatively low during the whole of childhood. Adenoid tissue is present in the nasopharynx at birth and may even then be sufficient to cause obstruction.

It is impossible to examine the nasopharynx with the mirror until the child is old enough to assist. This is usually not before it is eight years old. Prior to this time the examination must be made with the finger. This is somewhat difficult in infancy because of the small size of the parts, but can almost always be done if the examining finger is not too large. Care must be taken not to use force and thus tear the soft palate. The best way to examine is to stand behind the patient, holding the mouth open with the left forefinger or a gag, according to the age of the child, and introducing the right forefinger into the mouth. When held in this position the child is unable to get away.

The maxillary antrum is present at birth and the ethmoidal cells develop at about three years. The frontal sinuses are not developed until seven years.

Ear. No physical examination is complete in infancy and early childhood, unless some satisfactory explanation of the symptoms has been found elsewhere, without an examination of the middle ear. Disease of the middle ear cannot be ruled out, as is so often done, because there is no discharge. The absence of pain, of putting the hand to the ear and of tenderness over the mastoid, do not at this age by any means exclude the presence of disease of the middle ear. In fact, these symptoms are more often absent than present. The ear must be examined with the speculum. In this way only can the condition of the middle ear be determined. A smaller speculum than comes with most sets is needed to examine a young infant's ears.

Method of examination for Adenoids.

Showing mouth-breathing and funnel chest as a result of Adenoids.

In infancy the external auditory canal runs downward and inward. The ear must, therefore, be pulled downward and a little forward to straighten the canal instead of upward and backward, as in older children and adults. It must also be remembered that the drum is more horizontal at this age than later.

Hearing. Infants hear little or nothing during the first few days of life, probably because of the swelling of the mucous membrane of the tympanum and the absence of air in the middle ear. The hearing rapidly improves, however, and in a short time becomes very acute.

The mastoid antrum is present at birth, but the mastoid cells are usually not developed. They are, however, fairly well developed at three years.

Eyes. The eye is anatomically developed at birth. Vision is, however, probably very feeble. A strong light evidently causes discomfort during the first few weeks. The baby does not usually fix its eyes until it is at least six weeks old and coördination is not well developed until three months or later, at which time it seems to recognize objects. It is, therefore, of little use to attempt to test the accommodation in young infants. The pupils react to light almost immediately after birth, and this test can, therefore, be used at once. It is best performed by bringing a light from above the head downward in front of the eyes.

The function of the lachrymal glands is not developed at birth. Tears are shed, as a rule, at about three months.

Neck. The neck is relatively short during infancy, because of the large size of the head and its tendency to fall forward, the high position of the sternum and the large amount of fat tissue. The neck is also short and thick in cretinism.

Spine. The spine is largely cartilaginous at birth, ossification not being complete until the thirtieth year. It is, therefore, extremely flexible during infancy and early childhood. The infant is usually not able to sit up alone until he is about eight months old. The lumbar curve is less marked in the infant when sitting than in the child and adult. When infants are forced to sit up before they are able, or when infants and young children are feeble from any cause, they

usually sit with a marked general kyphosis, most marked in the lower dorsal region, the so-called "curve of weakness." This disappears when they lie down. It is important not to mistake this condition for the kyphosis due to disease of the spine, which is localized and does not disappear on lying down.

It is very difficult to count the spinous processes in the infant and young child, though it is easy to do so in older children. The first dorsal spine, not the seventh cervical, is usually the most prominent in infancy. Failure to appreciate this fact is likely to lead to error. The spine of the fourth lumbar vertebra is at the level of the highest point of the crest of the ilium at all ages. This fact is of importance in relation to the operation of lumbar puncture. In this connection it is important to remember that at birth the spinal cord extends to the third, and after one year to the second, lumbar vertebra.

Spina bifida with meningocele is obvious; it is easy, however, to overlook spina bifida occulta. Pigmentation of the skin or an unusual growth of hair is very common over the site of this malformation and should suggest its presence.

Chest. The relative sizes of the chest and head at different ages have already been discussed and are given in Table III.

The shape of the chest in infancy and early childhood is materially different from that in older childhood and adult life, the chest being rounder and shorter. The relation of the antero-posterior diameter to the lateral diameter of the interior of the thorax at birth is as two to three, while in the adult it is as one to two and one-half or one to three. The ribs bend much less backward than in the adult and are more nearly horizontal. The top of the sternum is higher and the lower angle of the ribs more obtuse. The change from the infantile to the adult type of thorax is nearly complete, however, at five years.

The sternum is narrow and almost entirely cartilaginous at birth, while the front of the chest is almost entirely made up of the costal cartilages, the ribs themselves being relatively much shorter than in later life. The chest is, therefore, more

Position of Rosary.

Extreme deformity of the chest in Rickets.

compressible and elastic in infancy and early childhood than later. Deformities of the chest, such as bulging of the precordia over an enlarged heart, are, for the same reason, more easily produced. When the intrathoracic pressure is increased, as in pleural effusion, the whole chest wall yields for the same reason before the intercostal spaces bulge.

Engorgement of the breasts with the secretion of a fluid resembling colostrum in appearance is not uncommon in the newly-born of both sexes. It usually appears from the third to the fifth day and persists for several weeks. It is a physiological, not a pathological, condition. The secretion is true milk and contains between 2.5% and 3% of fat, about 2.5% of sugar and from 2.5% to 3.5% of proteids.

Deformities of the chest are not at all uncommon in infancy and early childhood and at this age are in the vast majority of cases due to rickets. In later childhood they are most often due to tubercular disease of the spine, disease of the pleura or weakness of the muscles.

The most common abnormality in the chest caused by rickets is the "ROSARY." This is caused by an overgrowth of tissue at the junction of the ribs with their cartilages, which results in the formation of a series of prominences resembling beads. These, on account of the relative shortness of the ribs at this age, are situated farther out from the median line than is usually supposed. The line of junction of the ribs and their cartilages is always palpable in thin babies and it is sometimes difficult to distinguish this normal condition from a beginning rosary. It is a safe rule not to call anything a rosary unless a prominence can be felt at the sides of the junction of the ribs and cartilages as well as on the anterior surface. The beading usually appears first on the lower ribs.

The deformities of the chest in rickets are due primarily to the softening of the bones in this disease, which renders them unable to resist the pressure of the atmosphere and the pull of the muscles. Interference with free respiration, as by adenoids, increases the degree of the deformities. The most common deformity is a flattening of the sides of the chest. When this is localized and rather sharply defined, it is known

as "Harrison's groove." The flattening of the sides of the chest is usually accompanied by a flaring of the lower ribs, presumably due to the resistance of the large liver and the distention of the abdomen, so common in this disease. The flattening of the sides of the chest results in an increase in the antero-posterior diameter with a consequent prominence of the sternum. This, when marked, is known as "pigeon breast" or "chicken breast." A depression of the sternum resulting in the so-called "funnel chest" sometimes develops in rickets, but is more often a congenital anomaly.

Diaphragm. The central point of the diaphragm is probably somewhat higher in relation to the spine in infancy than in later childhood. The evidence on this point is, however, not very conclusive. The diaphragm reaches the adult position at five or six years, or a little later.

Position in Examination of the Chest. The best position for the examination of the front of the chest of an infant or small child is lying on its back. It is less likely to be frightened when lying on someone's lap than on a bed or table. An older child can be examined equally well when sitting up. The best position for the examination of the back of the chest of an infant or small child is in the nurse's arms with its arms around her neck. In this position there is no interference with respiration and the air can enter both sides alike, while the baby feels at home and is less likely to be frightened.

If the baby is too sick to be taken up it may be turned on its face. This is less satisfactory, however, because the weight of the body on the soft front of the chest interferes with full respiration. The back should never be examined when the baby is lying on its side, because the weight of the body on the elastic chest wall interferes materially with the entrance of air into the lower side and therefore diminishes the respiratory sound on this side, which may lead to erroneous conclusions. It is unwise to examine an older child when lying on its side, but the chances of error are less than in infancy. Older children are best examined when sitting up or lying on their faces.

It is usually wiser to examine the back of the chest of infants and small children before the front as, in this way they

Pigeon Breast.

Retraction of the chest at the insertion of the diaphragm.

Method of holding baby for examination of back of chest.

are less likely to be frightened. It is also wiser to auscult before percussing, partly because ausculation is less likely to frighten the babies than is percussion and partly because at this age the results obtained by auscultation, are, as a rule, more reliable than those obtained by percussion.

Stethoscope. The stethoscope is, on account of the small size of the parts, far preferable to the naked ear in the examination of infants and young children. It is very important, moreover, to use a stethoscope with a small bell; one with a diameter of three-quarters of an inch (2 cm.) is amply large enough. It is impossible to get a larger bell down on the chest of a thin baby, and a large bell transmits the sounds from too large an area and makes it impossible to locate their source accurately. The bell of the phonendoscope will, for example, cover nearly the whole of an infant's heart.

Heart. The volume and weight of the heart relatively to the body weight are greatest in the new-born, sink rapidly in the first and second years, increase again for a time, are smallest in the years before puberty and increase rapidly during puberty, reaching the adult relation.

The cardiac physical signs vary materially at different periods of infancy and childhood, because of the varying rapidity of the growth of the heart, thorax and other organs. In infancy, the comparatively large heart is placed more horizontally in the narrow thorax and is covered to a less extent by the lungs than it is later, giving, therefore, a set of physical signs materially different from those found in later childhood and adult life. The physical signs gradually approach the adult type with the development of the organism. The infantile form of thorax is replaced by the adult type between four and five years, while the diaphragm reaches the adult position at five or six years, or a little later. The lungs are not fully expanded forward until six years or later. The thymus modifies the signs in infancy and possibly for two or three years longer.

Cardiac Impulse. The cardiac impulse is rarely visible and frequently not palpable in early infancy. Later it is more distinct than in adults. Owing to the anatomical conditions already mentioned, it is at first higher up and

farther out than in later life. In infancy it is in the fourth space about one cm. ($\frac{3}{8}$ inch) outside the nipple line and from five cm. (2 inches) to six cm. ($2\frac{3}{8}$ inches) from the median line. As the result of the anatomical changes due to growth, it gradually moves downward and then inward, being in the fifth space in the nipple line at seven years, and always inside the nipple line by the thirteenth year.

Cardiac Area. The area of the relative cardiac dullness, because of the anatomical peculiarities already mentioned, is relatively larger than in adult life, and relatively larger in infancy and at puberty than at other periods of childhood. The area of absolute dullness — that part of the heart uncovered by lung — is relatively larger than in adults until the lungs are fully expanded at six years. On account of the small size of the parts it is impossible to determine accurately the area of absolute dullness in infancy. The usual mistake is in making the area too large. The right border is at the left sternal border throughout the whole of childhood. Fortunately the knowledge of this area is of relatively little importance. It is comparatively easy, however, to determine the area of relative dullness, which is the important one. In the first two years the dullness of the thymus may interfere with the determination of the upper border of the heart, but it can usually be made out by the aid of strong percussion.

In infancy, the upper border of relative dullness is at the lower border of the second costal cartilage or in the second space. The left border is one cm. ($\frac{3}{8}$ inch) outside the nipple line, or from five cm. (2 inches) to six cm. ($2\frac{3}{8}$ inches) to the left of the median line, the right border at, or just inside, the right parasternal line, or two cm. ($\frac{3}{4}$ inch) to the right of the median line.

At six years, the upper border of relative dullness is at the upper border of the third rib, the left border just outside the left nipple line, or seven cm. ($2\frac{3}{4}$ inches) to the left of the median line, the right border two and one-half cm. (1 inch) to the right of the median line.

At twelve years, the upper border of the relative dullness is at the third rib, the left border one cm. ($\frac{3}{8}$ inch) inside the left nipple line, or eight cm. ($3\frac{1}{8}$ inches) to the left of the

Area of cardiac dullness in infancy.

Area of cardiac dullness at six years.

Area of cardiac dullness at twelve years.

median line, the right border three cm. ($1\frac{1}{8}$ inches) to the right of the median line.

Heart Sounds. In early infancy the first sound lacks the booming quality heard later and is much more like the second sound, so that the sounds often resemble the "tic-tac" heart of the fœtus. The first sound acquires the normal booming character during the second year. The first sound at the apex is relatively much louder in comparison with the first sound at the base in infancy and early childhood than in later life. The second pulmonic sound is louder than the second aortic throughout the whole of childhood. For this reason great care must be exercised in diagnosing an accentuation of the second pulmonic sound. Reduplication of the second sound is not uncommon under normal conditions. When this occurs alone, it is, therefore, not necessarily pathological.

Pulse Rate. The rate of the pulse is very irregular in infancy, even under normal conditions. It varies markedly as the result of exertion, excitement or any slight disturbance. The rhythm is very easily disturbed. The pulse also becomes irregular from very slight causes in early childhood. Irregularity of the pulse is, therefore, of comparatively little significance in infancy and early childhood. It is impossible, for these reasons, to give more than approximate figures as to the pulse rate at these ages.

Early weeks,	120–140
First year,	110–120
Second year,	100–110
Two to five years,	90–100
Five to ten years,	80– 90

The pulse rate increases very markedly from slight causes in infancy and early childhood, and a very high rate may be quickly reached. Increased frequency of the pulse is, therefore, of less significance at this age than later.

Blood Pressure. The blood pressure in childhood varies with age, but not with sex. The general condition makes a great difference in infancy, the pressure being much lower in feeble or premature infants. It is lower when sleeping than

when awake, when quiet than when moving or crying, and before than after feeding.

Under six months,	60–90 mm. of mercury
Two to three years,	80–95 mm. of mercury
Five to six years,	100 mm. of mercury
Nine to ten years,	110 mm. of mercury

It must not be forgotten that venous hums are as common, or even more common, in infancy and early childhood as in later life. A systolic, most often late systolic, murmur is heard very frequently at the pulmonic area, and is functional in origin. Systolic murmurs are often heard also in the great vessels of the neck and are likewise functional. A systolic murmur is often heard under the manubrium in infancy. This is increased on extension of the head. In fact, it can be elicited in almost every infant by hyperextension of the head. This murmur is probably due to the pressure of the thymus on the vessels, the antero-posterior diameter of the upper opening of the thorax in infancy being only two cm. in diameter. This murmur is not due to enlargement of the bronchial lymph nodes, as was at one time supposed. It has no pathological significance.

Lungs. Percussion. Percussion of the lungs gives, in infancy and early childhood, less reliable information than auscultation. They have the same relative value in later childhood as in adult life. Finger percussion should always be employed. It is necessary to percuss lightly, because of the small size of the parts. Strong percussion is likely to set more than one organ in vibration and thus produce mixed sounds, which lead to confusion. It is very difficult to make out the lung borders accurately in infancy because the pleximeter finger often covers a rib and a space, or even two ribs and a space, while the tip of a large finger is almost as large as the superficial cardiac area. It must be remembered that, owing to the compressibility of the chest, the resonance is impaired on the under side, if an infant is laid on its side.

Resonance. The lower border of the lungs in infancy is, owing to the somewhat higher position of the diaphragm,

Position of lobes of lungs in front.

Position of lobes of lungs behind.

about one rib higher than in later life. The lower border of the lung resonance is, therefore, at the fifth rib in the right mammillary line, the seventh rib in the midaxillary line and the tenth rib in the scapular line. The lower border in the left midaxillary and scapular lines is about one space lower than on the right. There is no pulmonary resonance under the sternum during infancy, because the anterior borders of the lungs do not extend under the sternum at this age. The lung does not extend as far over the heart at this time as later, but the parts are so small that percussion of the lung-heart border is practically impossible. The adult relations are attained at about six years.

The relation of the lobes to the chest wall is essentially the same in infancy and childhood as in adult life. The line between the upper and lower lobes starts in the median line of the back at the level of the spines of the scapulæ, runs through the fourth rib in the midaxillary line and reaches the border of the lung at the sixth rib in the mammillary line on the left and the parasternal line on the right. The line between the upper and middle lobes on the right side diverges from the line between the upper and lower lobes at the outer border of the scapula, runs through the third rib in the midaxillary line and reaches the border of the lung in front at the fourth costal cartilage.

The percussion note is normally more resonant during infancy and childhood than in later life. Under normal conditions there is always a tympanitic element added at the left base, because of the proximity of the stomach. When the abdomen is distended with gas this tympanitic element is greatly exaggerated on the left side and may be present on the right side also.

Percussion of the apices in infancy and early childhood is impossible because of the small size of the parts. The percussion note is not higher pitched at the upper part of the right lung, as it is in adults. On the contrary, there is an area of impaired resonance under the inner third of the left clavicle up to nine or ten years, although it is difficult to elicit it in infancy. This area of dullness is due to the presence of the great vessels and the esophagus on this side, and

the fact that the left lung does not extend as far forward as the right.

Grocco's sign is found in infancy and childhood under the same conditions as in adult life and is of the same significance.

A very important point in the examination of the chest in infancy is the SENSE OF RESISTANCE, meaning by this term the resistance felt when tapping the chest with the ends of the fingers, not that felt on ordinary percussion. Much can be told as to the conditions within the chest in this way at this age, because of the thinness of the chest walls. This method of examination is of especial importance in the diagnosis between pleural effusions and consolidation of the lung, because the sense of resistance is much greater over an effusion than it ever is over a solid lung.

Respiration. The respiratory rhythm is often very irregular under normal conditions during the first two years. It is not uncommon for infants to hold their breath for a long time during auscultation. This is always strong evidence that there is no serious disease of the respiratory system.

The respiration is predominantly diaphragmatic in type during the first years, the thoracic element not being markedly developed until the seventh year. The variation in the type of respiration according to sex does not manifest itself until the tenth year. An inspiratory recession of the epigastrium is physiological in the early months of life. It is very difficult to give figures as to the rate of respiration at different ages, because it varies so much in different individuals and according to whether the child is asleep or awake, quiet or active. The following figures are approximately correct when the children are quiet.

At birth,	40–45 per minute
During the first two years,	25 per minute
At six years,	20 per minute
At ten years,	18 per minute

The respiratory sound is normally higher pitched up to late childhood than in adult life; that is, it is slightly changed from the vesicular toward the bronchial. This modification of the respiration is usually spoken of as *puerile*. It is

often mistaken for bronchial respiration, especially when the respiratory sound is diminished on one side, the mistake being due to the fact that proper attention is not paid to the difference between the quantity and quality of the respiratory sound. It will not be mistaken for bronchial respiration if it is remembered that when the character of the sound is the same on both sides, back and front, it cannot be bronchial. If there is any doubt as to whether respiration is puerile or bronchial, it can always be settled by comparing it with the respiratory sound heard over the trachea or at the root of the lungs, which is, of course, always bronchial.

Bronchial respiration is heard normally over a wider area at the root of the lungs in the back in infancy and early childhood than in late childhood and adult life. It is almost always heard in the interscapular space and may extend a little beyond the inner borders of the scapulæ. It is important to remember that bronchial differs from vesicular respiration in two particulars: the character of the sound and the greater length of the expiration. In infancy, owing to the normal variability in the relative length of inspiration and expiration, the character of the sound is of more importance than the relation between inspiration and expiration. The character of the respiratory sound is the same at both apices in infancy and early life, and the expiration is not prolonged at the right apex.

An area of dullness and bronchial respiration is often found in the left back between the scapula and the median line at about the level of the angle of the scapula when there is an effusion into the pericardium or when the heart is much enlarged. This area is due to the compression of the lung.

The respiratory sound is often so feeble in infancy, especially if there is disease of the lungs, that it is impossible to determine its character. In such instances the baby must be made to cry and thus to take a long breath. In this way, and in this way only, can a satisfactory examination be made. It is important to remember also that the respiratory sound is diminished on the lower side if the baby lies on its side. Failure to appreciate this fact often leads to a mistaken diagnosis of pneumonia on the upper side, the normal puerile

respiration being mistaken for bronchial because of the greater intensity of the sound on the upper side.

Pneumonia. Certain points as to the respiratory sound in pneumonia in early life are worthy of mention. A diminution in the respiratory sound, without change in its character, is often the earliest sign. It is the character, not the intensity, of the respiratory sound which is of importance in distinguishing between bronchial and vesicular respiration. Satisfactory conclusions cannot be drawn unless the baby is made to breathe deeply. Bronchial respiration is often heard first high up in the axilla. The examination is not complete unless the axillæ are examined. Loud bronchial respiration does not prove the presence of pneumonia and rule out a pleural effusion, because loud bronchial respiration is often heard when there is an effusion. Conversely, diminution in the respiratory sound, even when bronchial, does not exclude pneumonia, because the respiration is often diminished on the affected side in this disease.

Voice Sounds. What has been said regarding the character and intensity of the respiration applies equally well to the voice sounds. Reliance has to be placed, of course, in infancy, on the cry, not on the spoken voice. A change in the character of the voice sounds is often noticeable before there is any change in the respiratory sound, when there is beginning solidification of the lungs.

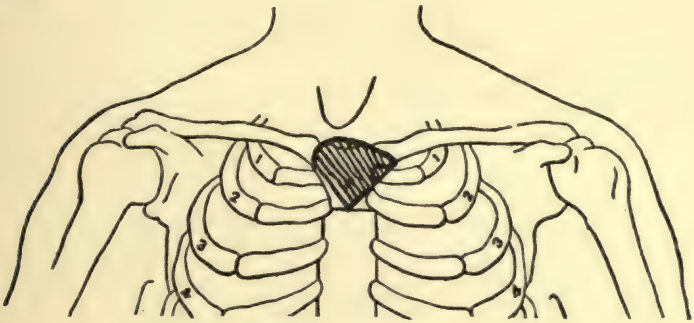
Tactile Fremitus. The fremitus, like the voice sounds, has to be determined in infancy from the cry rather than from the spoken voice. It is comparatively hard to distinguish any but marked variations in the fremitus at this age, and, owing to the elasticity of the chest wall, the fremitus is often transmitted unimpaired, even when there is a large collection of fluid in the chest. It is, therefore, of relatively little importance in infancy.

Râles. The character, varieties and significance of râles are the same in early infancy as in adult life. They often sound louder at this age, however, because of the thinness of the chest walls, and, for the same reason, are more often palpable. Râles made in the nose or nasopharynx are often transmitted to the chest in infancy and are often mistaken

for bronchial râles. They can, however, be easily distinguished. Bronchial râles are not audible over the cheeks and trachea and are never exactly the same on both sides and on the front and back. Râles made in the nose and nasopharynx are usually audible over the cheeks, always audible over the trachea, and sound exactly the same over the trachea and over both lungs, both back and front.

Pleural Friction Sounds. These sounds are, for some unknown reason, almost never heard in infancy, although inflammation of the pleura is common enough at this age. They are heard in childhood as frequently, and under the same conditions, as in adult life.

Thymus. The thymus may normally extend a little above the sternum. Practically, it is not palpable under normal conditions. If it is palpable, it is almost certainly enlarged. It is claimed that by light percussion the thymus gives in infancy the area of dullness shown in the accompanying diagram.



Dullness of Thymus.

Some claim that there is a zone of vesicular resonance between the lower border of the dullness of the thymus and the upper border of the cardiac dullness; others, that they are continuous. This dullness is said to gradually diminish and to be gone at six years. The author has found it extremely difficult to map out the normal thymus. When he finds dullness in this area it means to him enlargement of the thymus or some other pathological condition.

Abdomen. The abdomen in infancy, on account of the large size of the liver and the small size of the pelvis, is shaped

like an egg with the small end down. There is, therefore, no waist. The liver becomes relatively smaller as the child grows older, while the pelvis remains relatively small for several years. Its cavity is deep and the projection of the sacro-vertebral angle is less marked. The pelvis gradually increases in size, so that at puberty it presents, in both sexes, the characteristics of the adult male pelvis. It acquires its proper sexual characteristics after puberty. The shape of the abdomen changes with the changes in the relative size of the liver and pelvis.

When the normal infant is lying on its back, the sides of the abdomen form nearly a straight line from the costal border to the pelvis. Bulging outward shows enlargement of the abdomen and laxness of its walls. The level of the abdomen in infancy and early childhood, when the child is lying on its back, is normally somewhat above that of the thorax. It is on a level with the thorax, or somewhat below it, in later childhood. The lower abdomen is normally more prominent in early childhood than in later childhood and adult life. The lower portion of the abdomen is especially prominent in chronic duodenal indigestion and when there is prolapse of the abdominal organs. In this condition the child stands with an exaggerated lumbar curve and the shoulders thrown back.

The circumference of the abdomen at the navel is throughout infancy about the same as that of the chest. From this time on the chest is larger than the abdomen. The absolute circumference of the abdomen at the navel is of little importance, because of the normal variations in the size of different children and in the relative size of the abdomen in different children. The relation between the size of the abdomen and that of the chest is of more importance, but not of much, unless the variation from the normal is marked, because the relation between the abdomen and chest varies so widely under normal conditions in different children. Comparative measurements of the abdomen in the same child are, however, often of very great importance.

Enlargement of the abdomen is very common in infancy and early childhood as the result of disturbances of digestion.

Enlargement, while usually due to this cause, may, however, be due to more serious conditions, such as ascites and tubercular peritonitis. Enlargement of the abdomen in infancy should always suggest the possibility of sarcoma of the kidney as its cause. The signs of free fluid in the abdomen are the same throughout infancy and childhood as in later life. It is very easy, however, in infants and young children, when the abdominal walls are lax, to mistake liquid feces in the intestines for fluid in the peritoneal cavity, because under these conditions the liquid feces gravitate to the dependent portions of the abdomen. The presence or absence of a small amount of free fluid in the peritoneal cavity can often be determined, if the patient is an infant or young child, by holding it up with the face downward and percussing from underneath. The fluid, under these circumstances, will gravitate to the region of the navel. It must not be forgotten that both general and localized enlargements of the abdomen may be due to paralysis of the abdominal muscles.

The sunken abdomen is almost invariably due to lack of intestinal contents. It may, however, be due to contraction of the intestines, as in colitis. Contraction of the intestine from lead colic and hysteria is practically never seen in childhood. The abdomen is often sunken in meningitis. If it is, the depression is almost invariably due to the lack of intestinal contents, not to spasm of the abdominal muscles.

Spasm of the abdominal muscles is of the same significance in infancy and childhood as in later life. It is impossible, however, to determine whether spasm is present or not if the child is crying. It must be quieted in some way, therefore, if there is any possibility of the presence of some disease of the abdomen likely to be complicated by spasm.

Diastasis of the recti muscles is not at all uncommon in thin babies and in those whose abdomen is enlarged. It is much more common above than below the navel. It almost never persists into later childhood.

Epigastric herniæ are not at all rare in infancy and early childhood. They rarely disappear spontaneously.

Navel. The level of the navel is usually for a short time after the separation of the cord that of the abdomen. The

navel soon puckers in, however, forming a depression. Granulomata, accompanied by a thin purulent discharge, are common at this time. It is important not to confuse them with the so-called "mucous polyp," which is a protrusion of the mucous membrane of the intestine. The discharge in this condition is thin and serous. A fecal discharge from the navel at this time means patency of Meckel's diverticulum, while a discharge of urine means patency of the urachus. Hemorrhage from the navel is not at all uncommon in the first week after birth, and is usually a manifestation of hemorrhagic disease of the new-born. Inflammation in or about the navel, as the result of infection of the skin or of the vessels, is not infrequent. It must not be forgotten that infection through the vessels may occur without any superficial inflammation.

Umbilical hernia is not infrequent in infancy.

Stomach. The empty stomach is completely covered by the liver during infancy and early childhood. Even when filled, it extends but a short distance into the triangle formed by the edge of the liver and the left costal border. The transverse colon passes in front of it at this age. Percussion of the stomach is extremely difficult and the results obtained are unreliable. It is safe to say, however, that under normal conditions the lower border never extends to the navel. The boundaries of the stomach in late childhood are the same as in adult life.

The **Pylorus** is situated in infancy about midway between the tip of the ensiform and the navel in the median line or a little to the right. It is covered by the liver. It is not palpable when normal. If enlargement of the pylorus is suspected, the examination should be made both when the stomach is full and when it is empty, and with the abdominal walls relaxed. Relaxation of the walls can usually be easily obtained by making the child vomit or by washing out the stomach. Visible peristalsis is often present when there is stenosis or spasm of the pylorus. It is, of course, not present unless the stomach is full. If it does not appear after filling the stomach, the epigastrium should be flicked with a towel or the finger or rubbed with a piece of ice.

Gastric Capacity. The measurements ordinarily given for the gastric capacity at different ages are practically useless, because those based on experiments on the cadaver are obtained under abnormal conditions, while those based on the amount of food taken at a feeding neglect the fact that the pylorus opens and lets food through, even while it is being taken. It is safe to say, however, that the capacity of the stomach at birth is approximately one ounce. It is also true that the growth of the stomach is very rapid in the first three months, slow in the second three months, and more rapid in the fourth quarter than in the third.

Breast fed babies of the same age take in a general way about the same amount of food in twenty-four hours, but the amount taken at individual feedings varies tremendously according to the appetite at the time and the interval between the feedings. While these facts are true, experience shows, nevertheless, that artificially fed babies, if fed at regular intervals, take, on an average, about the following amounts:

Three months,	4 ounces (120 cc.)
Six months,	6 ounces (180 cc.)
Nine months,	8 ounces (240 cc.)
One year,	9 to 10 ounces (270 to 300 cc.)

Colon. The cœcum, in infancy and early childhood, lies wholly or in part between horizontal lines drawn parallel with the crest of the ilium and the anterior, superior spine. It gradually works downward, so that in later childhood it is in the adult position. This fact is of some importance in relation to the probable location of the appendix at various ages. Owing to the high position of the cœcum and the large liver, the ascending colon is relatively short in infancy and early childhood. The lower border of the transverse colon is, in infancy, just above the navel. It gradually gets higher, so that in late childhood it is about two-thirds of the distance from the ensiform to the navel.

Rectum. The attachments of the rectum to the surrounding structures do not extend as high up in the pelvis in infancy as later and the lower third is more vertical. These facts, taken in connection with the peculiar shape of the infantile

pelvis, predispose to prolapse. Malformation of the rectum, at or above the anus, should always be looked for, if the newly-born infant does not pass meconium.

Anus. Fissure of the anus is common in infancy and is usually overlooked unless the examination is careful and the folds are stretched. Hemorrhoids are rare at this age. Mucous patches may be found in this region at any age.

Liver. The upper border of the liver flatness is, on account of the slightly higher position of the diaphragm in infancy, somewhat higher at this age than later. It is at the fifth rib in the right mammillary line, at the seventh in the mid-axillary and at the tenth in the scapular line. It gradually descends, reaching the adult position at about six years. The large size of the liver and the wide angle of the ribs in infancy more than counterbalance the higher position of the diaphragm, so that the lower border of the liver extends below the costal border. It extends at this age from one cm. ($\frac{3}{8}$ inch) to three cm. ($1\frac{1}{8}$ inches) below the costal border in the mammillary line and from two cm. ($\frac{3}{4}$ inch) to six cm. ($2\frac{1}{4}$ inches) below the tip of the ensiform. There are no exact data as to when the adult relations are attained. The liver is, however, usually not palpable in the mammillary line after three years, although it probably may be felt normally up to eight years.

It is very difficult to percuss out the lower border of the liver in infancy and early childhood, because of the thinness of its edge. It is, on the other hand, very easy to palpate the lower border, since the abdominal wall is comparatively thin. Palpation, therefore, gives much more accurate results at this age than percussion. If there is any discrepancy in the results obtained by palpation and percussion, those obtained by palpation should always be accepted. It is important, on account of the thinness of the abdominal wall, not to palpate too deeply. It is very easy to miss the edge if too much force is used and the palpation is too deep. Striking palpation is of very little value at this age, ordinary palpation giving far better results.

Gall Bladder. The examination of the gall bladder is very unsatisfactory in infancy and early childhood. It is

extremely difficult to determine whether it is enlarged or not. As a matter of fact, it very seldom is enlarged at this age.

Spleen. The position of the spleen is the same at all ages. It lies between the ninth and eleventh ribs and the anterior border does not extend beyond the costo-articular line, that is, the line drawn between the left sterno-clavicular articulation and the tip of the eleventh left rib. Percussion of the spleen is very difficult during the first few years of life, because of its small size. It is seldom more than five cm. (2 inches) long and three cm. ($1\frac{1}{8}$ inches) wide at this time, being smaller more often than larger, while its thickness varies between one-half a cm. ($\frac{3}{16}$ inch) and one and one-half cm. ($\frac{5}{8}$ inch). The normal spleen is not palpable unless the abdominal wall is unusually thin and lax. It is easily palpable, however, in infancy and early childhood if enlarged, even if the enlargement is slight. It is wiser, therefore, to trust to palpation than to percussion at this age. It is safe to conclude that if the spleen is palpable it is enlarged and that if it is not palpable it is normal. It is important not to press in too deeply while palpating, as, on account of the thinness of the abdominal wall and the superficial position of the spleen, it is very easy to push it out of the way by deep palpation.

Kidneys. The kidneys are proportionately much larger in infancy than in later life, the relation of the weight of the kidneys to that of the body being in the infant as 1 to 120 and in the adult as 1 to 240. The kidneys are lower in relation to the vertebræ and iliac crests in the infant than in the adult, partly because of their relatively large size and partly because of the relatively small lumbar spine. The right kidney is said to be situated somewhat lower than the left, but there is some doubt as to this point. The adult relations are attained by middle childhood.

It is impossible to percuss out the normal kidney either in infancy or childhood. It is not possible to feel the normal kidney unless the patient is very thin, and then only occasionally. If the kidney is palpable, the presumption is, therefore, that it is in some way abnormal.

Floating kidneys are very uncommon in either infancy or childhood, and, if present, are usually congenital in origin. Tumors of the kidney make their appearance in the lumbar region, in the side or in the antero-lateral portion of the abdomen. They do not move with respiration. The colon is in front of them.

Bladder. On account of the small size of the pelvis, the relatively large size of the rectum and the greater obliqueness of the pelvis in infancy, almost the whole of the bladder lies, at this age, above the pubic crest. When the bladder is distended, practically the whole of the distention is upward into the abdomen. The distended bladder is ovoid in shape, the larger end being downward. There is no marked fundus. The tendency is for the bladder, when distended, to lie close to the anterior abdominal wall. Very little of the anterior surface is covered by peritoneum. When the child begins to stand and walk, the weight of the urine gradually changes the shape of the bladder. The shape of the pelvis also changes, so that by middle childhood the relations of the bladder are essentially the same as in the adult. The bladder at birth holds from two to four drachms (7.5 cc. to 15 cc.), while at six months its capacity is about one ounce (30 cc.). It is impossible to give any figures as to its capacity after this time, because of its great distensibility.

The relatively high position of the bladder in infancy and early childhood must always be borne in mind, as otherwise it is easy to mistake it for a new growth or for fluid in the peritoneal cavity. The bladder should always be emptied by a catheter in every instance in which there is a question of an abdominal tumor or of free fluid in the abdomen. Some very awkward mistakes will be avoided in this way.

The groins should always be carefully examined, because hernia is common and hydrocele of the cord not uncommon in this region. Inguinal adenitis is also common. An incompletely descended testicle is not infrequently found in this region and sometimes a misplaced ovary.

External Genitals. The routine examination of the newborn infant should always include that of the external genitals. The most common abnormalities are: in females,

more or less extensive adhesions of the nymphæ; in males, failure of or partial descension of the testicles and hypospadias. The labia minora are relatively large in infancy and early childhood and project beyond the labia majora. The prepuce is normally adherent to the clitoris throughout infancy and probably even longer. A bloody discharge from the vagina, probably the result of local congestion during labor, is not uncommon during the first few days of life. It must not be confused with hemorrhage from the vagina, symptomatic of hemorrhagic disease of the new-born.

The glans penis is almost invariably completely covered by the prepuce and in the vast majority of instances the prepuce and glans are bound together by light adhesions. This is the normal condition and is different from phimosis, which is the condition in which the prepuce is so narrowed that it cannot be retracted over the glans.

Extremities. The infant begins to reach out and grasp things purposefully when three or four months old. It begins to creep at about nine months, stands with help at ten or eleven months and walks alone at about fifteen months. These are, of course, average figures. Many infants do these things earlier and many others are tardy about standing and walking.

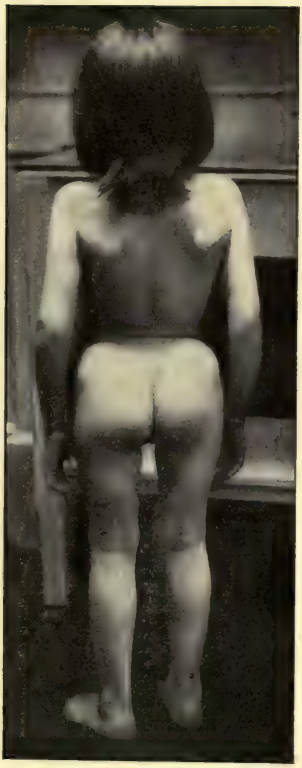
Deformities of Extremities. Deformities of the extremities in infancy and early childhood are, in the vast majority of instances, due to rickets. The most common of these deformities is enlargement of the epiphyses at the wrists and ankles, the wrists being affected more often than the ankles. When both are affected, the enlargement is usually more marked in the wrists. It is important not to confuse these enlargements of the epiphyses due to rickets with the enlargements due to syphilis. The enlargements of rickets occur in the epiphysis and at the epiphyseal line, while the enlargements due to syphilis occur at the lower end of the diaphysis at its junction with the epiphyseal line.

The next most common deformity of the extremities is bowing of the long bones. This occurs much more often in the lower than in the upper extremities and in them results in bow-legs and knock-knees. Knock-knees are, however,

probably more often due to an overgrowth of the inner condyles of the femora than to bowing of the bones. The best method of examination as to the presence or absence of bow-legs and knock-knees is with the child on its back and the legs extended. It is important not to confuse the normal bowing of the legs in infancy with pathological bowing. The normal bowing is of two types: a slight outward bowing of the lower third of the tibiæ, present during the first few months of life, and a general outward bowing of the legs, which persists through the first year and sometimes longer. This latter bowing is apparent rather than real and is due to the fact that at this age complete extension at the knees is rarely possible. Unless care is taken to avoid outward rotation of the thighs, the lines of the partly flexed legs are compared instead of the inside lines of the legs. These lines are, of course, bowed and are often the cause of an erroneous diagnosis of bow-legs.

The sabre-like deformity of the tibiæ in syphilis is often confused with the similar deformity caused by rickets. The deformity due to rickets appears in infancy, while that due to syphilis develops between three and ten years. When due to syphilis, it is associated with other signs of syphilis; when due to rickets, with other signs of rickets. When due to syphilis, it is usually the only bony deformity; when due to rickets, it is always associated with other gross deformities of the bones.

It is important to notice whether the legs are of the same length. This is most satisfactorily determined by extending the legs while the child lies on its back. If they are not of the same length, the discrepancy is due to an actual difference in size or to congenital dislocation of one hip. If the shortening is due to congenital dislocation of the hip, the trochanter will be found above Nélaton's line, the line drawn from the anterior superior spine of the ilium to the tuberosity of the ischium on the same side. In congenital dislocation of the hip the leg can be pulled down into the normal position. Double congenital dislocation of the hip is very unusual, but does sometimes occur. It is always well, therefore, to determine whether or not the trochanters are in the proper



Congenital dislocation of the hips.

position and whether the legs can be pulled down from their usual position.

Size of Extremities. The circumference of the arms and legs on the two sides is normally alike during infancy and childhood. Differences in size, if they are present, are usually due to wasting on one side, not to hypertrophy. It is very important, in testing for differences in size, to measure both extremities in exactly the same place. This can only be done by taking the measurement at some fixed distance from some bony landmark on both sides. No attention should be paid to differences of less than one cm. ($\frac{3}{8}$-inch), because such differences are within the limits of error in measurement.

The shafts of the bones should always be examined for swelling, tenderness and fractures. The contour of the joints should also be noted. In a general way, swelling and tenderness over the long bones in infancy are most often due to scurvy, next to periosteitis; in childhood, to periosteitis. Acute swelling of the joints in infancy and early childhood is most often due to septic arthritis; in later childhood, to rheumatism. Chronic swelling of the joints at any age is most often due to tuberculosis; comparatively seldom to syphilis.

Position of Extremities. Improper position of the extremities may be due either to permanent contractures or to temporary spasm. It must be remembered that in early infancy and in emaciated infants there is a normal hypertonicity of the muscles, most marked in the flexors, which prevents the complete extension of the extremities. The results of this normal hypertonicity must not be mistaken for permanent contractures. It is important to notice the character of temporary spasm; whether, for example, the hands and feet are in the position of tetany or the hands clenched.

It is not safe to assume that there is no spasm because when the child is quiet the extremities are in the normal position. Passive motions of the extremities should always be made to determine whether there is or is not any spasm. If resistance is encountered, it must be determined whether it is due to voluntary opposition or involuntary spasm. It is also important to determine whether the spasm is due to pain or

not. It is important to remember that the spasm in cerebral paralysis in early infancy is often first shown by opposition to abduction of the thighs.

Paralysis. If the child is unconscious, the presence or absence of paralysis must be determined by the way in which the extremities drop when they are let fall and by the amount of resistance which is encountered on passive motion. If conscious, older children will attempt to make the various motions as directed. Infants, however, will not do this. The power in the arms must be tested by offering them things to play with or showing them their bottle; that in the legs by tickling their feet or pricking them with a pin. It is important to distinguish failure to use the extremities, because of the pain which motion causes, from real paralysis.

Knee-jerks. The response to tapping the ligamentum patellæ normally varies widely in infancy. It is often very hard to elicit the knee-jerk in infancy, because of the baby's failure to relax. It cannot be determined, however, unless the leg is relaxed, and on this account great patience is often required. The best method of eliciting the knee-jerk in infancy is to place the hand under the lower part of the thigh when the baby lies on its back, lifting it a little from the bed. A response can sometimes be obtained if the angle of the leg on the thigh is varied, the ligament being tapped repeatedly as the knee is moved up and down. The knee-jerk is best elicited in childhood by having the child sit up with the leg hanging down, as in adult life.

Abdominal Reflex. This reflex is very inconstant in infancy and early childhood.

Cremasteric Reflex. This reflex is lively in infancy, but much less so during childhood. Neither the abdominal nor the cremasteric reflexes are of much importance, however, unless they are different on the two sides.

Plantar Reflex. The plantar reflex in infancy is more often shown by extension than by flexion of the toes. BABINSKI'S PHENOMENON, which is the simultaneous extension of the big toe with flexion of the other toes when the sole of the foot is scratched, is, therefore, of no diagnostic importance in infancy. It is of the same value in childhood as in later life.

Method of eliciting Knee-jerk in infancy.

Kernig's sign.

Neck sign.

Babinski's phenomenon shows some irritation or affection of the pyramidal tract.

Kernig's Sign. Under normal conditions the leg can be extended on the thigh to an angle of 135° or more when the thigh is at a right angle with the trunk. Kernig's sign consists in the inability to extend the leg on the thigh, when it is at a right angle with the trunk, to as much as 135°. This sign is best tested with the child lying on its back. It makes no difference whether the thigh is flexed to a right angle on the trunk and the attempt then made to extend the leg or the leg extended on the thigh, with the thigh extended, and the attempt then made to bring the thigh to a right angle with the trunk. Kernig's sign is an involuntary manifestation and may or may not be accompanied by pain. The physiological hypertonicity of young and emaciated infants may be mistaken for Kernig's sign, if it is not borne in mind. Kernig's sign is strong, but not positive, proof of meningitis in infancy and early childhood.

Neck Sign. Under normal conditions flexion of the head forward, when the child is lying on its back, causes no motion of the extremities. Under certain conditions, however, passive flexion of the neck forward, while the child is lying flat on its back, the chest being held stationary, causes flexion of the legs at the hips and knees, but sometimes only at the hips. This sign is known as Brudzinski's neck sign. It is sometimes present on one side and not on the other. It is present in many cases of meningitis and is almost never found in any other condition.

Contralateral Reflex. Under normal conditions passive flexion of one leg causes no motion on the other side. In meningitis, and sometimes in other conditions, passive flexion of one leg causes a concomitant reflex of the leg on the other side — the identical contralateral reflex. Sometimes, however, the motion of the other leg is extension instead of flexion — the reciprocal contralateral reflex.

Trousseau's Symptom. Pressure on the nerve trunks of an extremity normally causes no reaction. In the spasmophilic diathesis, however, pressure on the nerve trunks of an extremity not only brings on the typical spasm of tetany in

that extremity but also in the others. This reaction is known as Trousseau's symptom.

Chvostek's Symptom or the Facial Phenomenon. Under normal conditions mechanical irritation of the facial nerve produces no contraction. In the spasmophilic diathesis, however, irritation of the facial nerve, either by striking it or rubbing something quickly across it, causes contraction of the facial muscles on that side, especially of those of the lips.

Sensation. Sensation to touch and pain can be made out even in infancy, although it is not very active during the first few months. Sensation to differences in temperature cannot, of course, be determined until the child is old enough to know hot from cold and to talk. Sensation is, in general, the same throughout childhood as in adult life.

Vasomotor Disturbances. Superficial vasomotor disturbances of the skin are not at all uncommon in infancy and childhood in many pathological conditions. The tâches cérébrales, are, therefore, of no importance in the diagnosis of cerebral diseases.

Lymph Nodes. Local enlargement of the lymph nodes is of the same significance throughout infancy and childhood as in adult life. General enlargement of the peripheral lymph nodes occurs in infancy, however, in all disturbances of nutrition. At this age, therefore, it does not point to tuberculosis, syphilis or some blood disease. The epitrochlear and occipital lymph nodes are often enlarged in disturbances of nutrition. Enlargement of these glands, therefore, does not at this age point toward syphilis. General enlargement of the peripheral lymph nodes in later childhood is of the same significance as in adult life. It is important to remember that there is no anatomical or physiological connection between the lymph nodes of the neck and those of the chest.

The physical signs of enlargement of the tracheo-bronchial lymph nodes, while theoretically very definite, are practically very unreliable. The earliest, and probably most reliable, sign is the bronchial voice sound over the upper four or five dorsal spines, this normally not being heard below the seventh

cervical spine. When the enlargement is greater, the respiration also is bronchial in this region. If the glands are much enlarged, they may cause dullness in the interscapular region and under the manubrium and upper portion of the gladiolus. This latter dullness may as well, however, be due to an enlarged or persistent thymus. Bronchial breathing between the scapulæ is also a sign of bronchial adenopathy. Murmurs under the manubrium, which are louder when the head is extended, are often attributed to enlargement of the tracheo-bronchial lymph nodes. They are undoubtedly due to this cause in some instances, but, since they can be produced in any baby by extending the head, are of no importance in diagnosis. If the lymph nodes are much enlarged, they may by pressure cause a difference in the amount of the respiratory sound on the two sides, distention of the cervical veins, edema of the face, atalectasis of the lung, hoarseness and aphonia. Expiratory dyspnea is also a sign of enlargement of these nodes.

Development of Faculties. It is often of great importance to determine whether or not a baby is normally developed mentally. This must be decided by comparing its development with that of the normal baby of the same age. To do this it is necessary to know what the normal baby should be able to do at a given age. Babies differ so much in their mental development under normal conditions, however, that it is impossible to give more than average figures. In a general way, the baby smiles at from four to five weeks, and laughs at from five to six months. He begins to notice objects at from six to eight weeks, and probably knows his mother or nurse from other people when about three months old. He shows signs of fear at six months, or even younger, and shows plainly his likes and dislikes at a year. He enunciates single words at from ten to twelve months, and forms short sentences by the middle or end of the second year. He makes purposeful gestures at eighteen months. He should control his sphincters by two years. This point is of comparatively little value, however, as the development of the control of the sphincters depends very largely on the baby's training.

Skin. The skin should always be examined for eruptions, ecchymoses, desquamation and scars. Its color should also be noticed. The color of the nails and of the mucous membranes is a far better index of the condition of the blood, however, than the color of the skin. It must not be forgotten that many pale children are pale because of the small size of the skin capillaries and the thickness of the skin, not because of anemia.

Bluish or bluish-black spots in the sacral and gluteal regions occur in 90% of Asiatic children and in those with negro blood. They are known as *Mongolian spots* and are also sometimes seen in white children. They gradually disappear and are almost always gone before the close of infancy. They are due to a deposit of pigment in certain cells of the corium. They are, moreover, not a sign of an admixture of negro blood, but merely of the persistence, in a rudimentary form, of a functional layer of pigment cells in our ancestors, the monkeys.

Three conditions of the skin which are liable to be confused are edema, sclerema and angioneurotic edema. Edema may occur at any age, appears first in the eyelids, on the dorsa of the feet and in dependent portions, is not hard, pits on pressure, is not associated with rigidity and is pale or waxen in color. Sclerema occurs in the new-born, or in very feeble infants. It usually develops first in the cheeks, back or posterior surfaces of the legs, but may appear anywhere, except in the prepuce, scrotum, palms and soles. It is hard, does not pit on pressure, is accompanied by rigidity of the extremities and is of a normal or slightly bluish color. Angioneurotic edema may be general, but is usually circumscribed. It may appear in any position. It is usually somewhat pinkish in color, does not pit on pressure and is often accompanied by itching.

The function of the SWEAT glands is usually not developed at birth. Babies ordinarily begin to perspire when they are from three to five weeks old.

THE URINE. The Urine in the Newly-born. The first urine is acid, almost always clear and but little colored. During the first four or five days it is usually more or less cloudy from the

presence of epithelial cells from the urinary passages and uric acid crystals. The specific gravity averages about 1012. Small amounts of albumin are almost always present, but rarely last longer than ten days. The sediment always contains epithelial cells, various forms of uric acid crystals, and now and then hyaline casts. The amount of urine is small. It increases rather rapidly on the fourth day, 20 to 50 cc. being passed in the first three days and about 100 cc. on the fourth day. It averages between 200 cc. and 300 cc. in the second week.

The Urine in Infancy. The odor is slight, the color pale. It is usually clear, sometimes slightly opalescent and not infrequently turbid from mucus. Turbidity should always suggest the possibility of an infection of the urine with colon bacilli. If the turbidity is not cleared by heat, a microscopic examination should always be made. The reaction is feebly acid. The specific gravity varies from 1003 to 1008 in the first six months, and from 1006 to 1012 up to two years. It does not contain albumin, and sugar is absent with the ordinary reagents. Sugar is not infrequently found in the urine of healthy infants during the first two months, and may be made to appear in the urine by increasing the amount ingested. According to Grósz, lactose appears in the urine when more than three or four grams per kilo of body weight are given, the limits of tolerance for other sugars being higher, that for glucose being five grams and that for maltose nearly eight grams per kilo. The sediment is slight and consists entirely of cells. The amount of urine is relatively large, the infant passing from five to six times as much urine per kilo of weight as the adult. It varies between 200 cc. and 500 cc. from the first to the seventh month, and between 250 cc. and 600 cc. up to two years. The characteristics of the urine in childhood are essentially the same as in the adult. The quantity, however, is three or four times as large per kilo of weight as in the adult. It is impossible, however, to give anything more than approximate figures as to the amount passed at different ages, because of the variations dependent on the amount of fluid ingested. Holt has combined the figures

of a considerable number of observers and arrived at the following results:

Two to five years,	500– 800 cc.
Five to eight years,	600–1200 cc.
Eight to fourteen years,	1000–1500 cc.

The specific gravity is on the whole somewhat lower in childhood than in adult life. It is impossible to give any figures as to the specific gravity at different ages, because of the normal variations according to the amount of fluid ingested.

The Blood. Hemoglobin. The percentage of hemoglobin varies between 100 and 125 during the first three or four days of life. It then rapidly drops to the minimum of about 60% in three weeks, after which it gradually rises to about 70% at six months. It remains at this point during the rest of the first two years, after which it slowly rises, reaching the adult standard at about six years. The normal variations in the percentage of hemoglobin in different children and at different times in the same child are very marked. The percentage of hemoglobin averages somewhat higher in boys than in girls.

Red Corpuscles. The number of red corpuscles per cubic mm. during the first two or three days of life varies between 6,000,000 and 7,500,000. The large number of red cells at this time is probably due to a combination of loss of fluid and starvation. The number of red cells then rapidly falls to the normal infantile limit, which it reaches at about two weeks. The number of cells during infancy ranges between 5,500,000 and 6,000,000. The number gradually diminishes during early childhood, reaching the adult standard at approximately six years.

Variations in the size and shape of the red cells develop much more quickly in infants and in young children than in older children and adults. Nucleated red cells are normally present in small numbers during the first six days. They appear with less provocation during infancy than later.

White Corpuscles. There is a marked increase in the number of leucocytes during the first few days, this increase

sometimes reaching as high as 36,000. The number rapidly drops to from 12,000 to 14,000, where it remains during the first six months. The normal limits during the rest of infancy are between 10,000 and 12,000 per cubic mm. The number of leucocytes from this time on is approximately the same as in adults.

The digestive leucocytosis is very inconstant and irregular in infancy. Leucocytosis develops more quickly and is usually more marked in infants and young children than in older children and adults. The type of leucocytosis is also less constant at this age, a considerable increase in the number of mononuclear cells being not uncommon. The percentage of polynuclear cells is high at birth, rises during the first twenty-four hours to 70% or a little more, then quickly drops to the normal infantile relation at the end of the first week or ten days. The relations of the different normal forms of leucocytes throughout infancy are roughly as follows:

Small mononuclear,	40% to 50%
Large mononuclear and transitional forms,	10%
Polynuclear neutrophiles,	35% to 45%
Eosinophiles,	1% to 5%
Mast cells,	1%

The mononuclear cells vary much, not only in the size of the cell as a whole but also in the size of the nucleus and in the amount of protoplasm. The percentages of the large mononuclear and transitional forms and of the eosinophiles remain about the same to middle childhood, while that of the small mononuclear cells gradually diminishes and that of the polynuclear neutrophiles increases until the adult relations are reached at from five to six years.

Myelocytes are not normally present in the infant's blood. They appear, however, on relatively slight provocation and sometimes in considerable numbers. Their presence is, therefore, of much less significance at this age than later, a percentage of from five to six, or even more, not being very unusual at this age in secondary anemia.

An increase in the number of eosinophilic cells is not

uncommon in infancy and early childhood and seems to be of but little significance. The percentage may be as high as ten without any evident cause. A high percentage of eosinophiles should, however, always suggest the presence of intestinal parasites.

In considering the blood changes in infancy and early childhood certain points must be borne in mind: Blood changes develop more easily and more frequently as the result of morbid conditions and diseases than in older children and adults. All the changes seen in later life as the result of disease are aggravated in infancy. The tendency is always to revert to a younger or to the fœtal type of blood. As the result of the tendency to aggravation of changes and to reversion to a younger type of blood, the red corpuscles show much greater variety in size and shape and many more nucleated forms are seen than under similar pathologic conditions in the older child and adult. In general, the most characteristic features of all the blood diseases of infancy are the relatively low percentage of hemoglobin, the relatively large number of non-granular cells and the marked morphological changes in the red corpuscles.

The Stools in Infancy. The characteristics of the stools in infancy are so different from those of children after they have begun to take an ordinary mixed diet that they deserve special description. The characteristics of the stools of children are the same as in the adult.

The stools differ normally according to whether the infant is taking human milk or cows' milk, and whether starches or other carbohydrates are added to the cows' milk.

The Stools of Breast-fed Infants. The breast-fed infant has, during the first few weeks or months of life, three or four movements daily of the consistency of pea soup, of a peculiar golden-yellow color, with a slightly sour or aromatic odor, and with a slightly acid reaction. The number of stools diminishes later to two or three in the twenty-four hours and the consistency becomes more salve-like, the other characteristics remaining the same. The golden-yellow color is due to bilirubin, which passes unchanged through the intestinal tract because of the rapidity of the passage, the relatively

low proteid content of the milk and the low reducing power of the infant's intestine. The odor is due to a combination of lactic and fatty acids. The acid reaction is due to the relative excess of fat over proteid in the milk.

It is not uncommon, even when babies are doing well on the breast, for them to have a larger number of stools of diminished consistency and of a brownish color. In such instances examination of the breast milk usually shows that the proteids are high. It is also not unusual to find numerous soft, fine curds and sometimes mucus in the stools of healthy breast-fed babies. While such stools are undoubtedly abnormal, it is unwise to pay too much attention to them if the baby is gaining and seems well.

The Stools of Infants fed on Cows' Milk. Infants that are thriving on cows' milk mixtures have, as a rule, fewer movements in the twenty-four hours than breast-fed babies and these movements are of firmer consistency. Slight constipation is not uncommon after the first few months and is not of pathological significance. The color of the stools is a lighter yellow, probably because of the relatively larger amount of proteid, and because some of the bilirubin is converted into hydrobilirubin. When the relative proportions of fat and proteids in the mixtures are approximately those of breast milk, the odor and reaction of the stools are essentially the same as when the infant is taking breast milk. When infants are given whole cows' milk or simple dilutions of cows' milk, so that the proteids are equal to or greater than the fat, the odor is slightly modified toward the fecal or cheesy because of the action of bacteria on the casein. The reaction becomes alkaline for the same reason.

Skimmed Milk Mixtures. When infants are fed on skimmed milk or on mixtures very low in fat and high in proteids, the stools have a slightly brownish-yellow color, a slightly cheesy or foul odor, and a strongly alkaline reaction because of the longer stay of the casein in the intestine and the consequently greater opportunity for bacterial action and for the change of bilirubin to hydrobilirubin. In some instances the stools have a peculiar salve-like appearance like those from buttermilk.

Whey and Whey Mixtures. When infants are fed on whey or whey mixtures low in fat, the stools have essentially the same characteristics as those from skimmed milk, except that they are usually browner.

Starch Mixtures. When starch is added to cows' milk mixtures the color of the stools becomes distinctly brownish and the reaction tends toward the acid. The odor is more aromatic. Most starch flours contain small brownish specks which are the remains of the husks. These specks pass through the gastrointestinal tract unaffected and appear in the stools.

Malt Sugar Mixtures. The addition of malt sugar to cows' milk mixtures changes the color of the stools to a distinct brown, tends to make the reaction acid and to increase the acidity of the odor. When malt sugar or the malted foods are given without milk the stools are dark brown, sticky, acrid in odor and acid in reaction.

Buttermilk and Buttermilk Mixtures. The stools of infants fed on buttermilk and buttermilk mixtures are of a peculiar shiny, salve-like appearance, grayish-brown in color, alkaline in reaction and have a very characteristic acrid odor.

Animal Food. When beef-juice or broth is added to the infant's diet the color of the stools is changed to brown, while the odor becomes fecal and the reaction alkaline from the action of bacteria on the proteids.

The Starvation Stool. The starvation stool is made up of bile, the intestinal secretions and bacteria and resembles the meconium. It is usually small, sometimes constipated, sometimes loose, brownish or brownish-green in color and has, as a rule, a stale odor like that of starch or paste. In some cases it has the odor of acetic acid as the result of the action of microörganisms.

Reaction of the Stools. The reaction of the normal stool depends on the relation between the fat and proteids in the food. When there is a relative excess of fat the reaction is acid; when there is a relative excess of proteid the reaction is alkaline, the reaction depending, in the one case on the products of the decomposition of fat, in the other on the products of the decomposition of proteids. The carbo-

hydrates have no effect on the reaction of the normal stool. When the carbohydrates are in excess, or when there is fermentation of the carbohydrates as the result of bacterial action, the acidity of the stools is markedly increased. Stools which irritate the buttocks are invariably acid in reaction, and in most instances this excessive acidity is due to the decomposition of carbohydrates. Frothy stools are usually acid in reaction, and due to the same cause, but sometimes the frothiness is caused by gases formed during the decomposition of proteids. The reaction of the stools is, however, of comparatively little importance from the clinical side. It is best tested by placing wet red or blue litmus paper on, not in, the stool.

Odor of the Stools. The odor of the stools depends on the composition of the food, the rapidity of the absorption of the products of digestion and the degree of the bacterial activity. The fats give the odor of butyric or lactic acid to the stools. The carbohydrates, if thoroughly utilized, do not affect the odor; if not utilized, they give the odors of lactic, acetic or succinic acids. The proteids give cheesy odors of various sorts, sometimes those of skatol, indol and phenol.

The odor of the normal stool and the influence of variations in the diet upon it have already been mentioned. The stools of fat indigestion have a strong odor of butyric acid, those of proteid indigestion various cheesy or putrefactive odors as the result of the decomposition of the proteids by bacteria. When several elements of the food are improperly digested the odor is a combination of those resulting from the decomposition of the various elements. The stools of cholera infantum are almost odorless. Stools composed almost entirely of mucus have a peculiar aromatic odor, resembling that of wet hay. When there are deep ulcerative or gangrenous processes in the intestine, the stools have a putrefactive or gangrenous odor.

Color of the Stools. The normal variations in the color of the stools according to the composition of the food have already been mentioned. Abnormalities in the color are very common. The color of the stool must not be judged from the outside, as it may change very rapidly from drying and

exposure to the air. The stool must be broken up or smoothed out and the inside examined.

Green. The most common abnormal color is green. The shade of green may vary from a very delicate light grass-green to a dark spinach green. In a general way, the darker the green the greater its significance. A very light grass-green color in a stool which is otherwise normal is of no practical importance. The change from yellow to green after the stool is passed is not abnormal. The green color is, in the vast majority of instances, due to the change of bilirubin to biliverdin. There is much doubt as to the cause of this change. It is probable that it may be due to either excessive acidity or alkalinity of the intestinal contents or to the presence of some oxidizing ferment. The green color is not characteristic of any special type of disease. In some instances it is due to the action of the bacillus pyocyaneus. If it is due to bacterial action, the addition of nitric acid decolorizes the stool. If it is due to biliverdin, the addition of nitric acid gives the characteristic colors of Gmelin's test.

Gray. The next most common abnormal color is gray. This is due, as a rule, to the absence of bile and the presence of some form of fat in the stool. It must be remembered, however, that there may be bile in the stool even when it is gray, the bile pigment being in the form of the colorless leucohydrobilirubin. It is never safe, therefore, to conclude that there is no bile in the stool without a chemical examination. The easiest and most satisfactory test is that with corrosive sublimate. When the stools are gray at birth, or become so within a few days after birth, the lesion is usually a congenital obliteration of the bile ducts. When the gray color appears later, and especially when it is associated with large amounts of mucus, the trouble is usually in the duodenum.

White. The white stools are due to the presence of undigested fat in the form of soaps. These may be soft, looking much like curdled milk, or, more often, hard and dry, resembling the stools of a dog which has been eating bones.

Black. The black stool, while in rare instances due to the presence of changed blood, is usually due to the action of some drug, ordinarily bismuth, sometimes iron.

It is very common to see a pink stain on the diapers about a stool which is otherwise normal, or nearly so. This pink stain is of no especial significance and is due to some unknown change in the bile pigment.

Abnormal Constituents. *Curds.* The most common abnormal constituents are curds. There are two kinds of curds, one primarily composed of casein, the other composed mainly of fat, mostly in the form of fatty acids and soaps. The small amount of fat in the casein curds and the small amount of proteid in the fat curds are merely incidents. The casein curds vary in size from that of a bean to that of a pecan nut. They are usually white, sometimes yellow, in color. They are firm and tough, cannot be broken up by pressure and sink in water. When placed in formalin they become as hard as rocks. They are insoluble in ether. The fat curds are small, varying in size from that of a pinhead to that of a small pea. They vary in color from white to yellow or green, according to the general color of the movement. They are easily broken up by pressure, and, when shaken up in water, tend to remain in suspension. They are soluble in ether to a considerable extent after acidification and are unaffected by formalin.

Mucus. Mucus can be detected in small amounts under the microscope in the majority of normal stools, and is almost invariably present in abnormal stools. It is never present macroscopically in normal stools, but is very common in the abnormal. It does not denote any special form of disease, merely an excessive secretion of the mucous glands of the intestine from some cause. When thoroughly mixed throughout the stool it usually comes from the small intestine; when in combination with a clay-colored stool, from the duodenum; when on the outside of a constipated stool, from the rectum. Stools composed mainly or entirely of mucus and blood indicate either severe inflammation of the colon or intussusception. Undigested starch is often mistaken for mucus. They can be distinguished by the addition of some preparation

of iodine, which stains the starch blue, but does not affect the mucus. The suspected material should be taken off the diaper in order to avoid possible confusion from the presence of starch on the diaper.

Blood. Blood on the outside of a constipated stool indicates a crack of the anus. Blood mixed with mucus indicates either severe inflammation of the large intestine or intussusception. Blood in infancy is seldom due to hemorrhoids.

Pus. Pus indicates severe inflammation of the large intestine. It is usually not present early in the disease, but appears later. When the infants survive the acute stage it persists into convalescence. Pus can be found with the microscope in nearly every case of inflammation of the colon, but is of no special significance unless visible macroscopically.

Membrane. Membrane indicates very severe inflammation of the large intestine and is rarely seen, the patients usually dying before membrane appears in the stools.

Other abnormal constituents are undigested masses of food, foreign bodies which have been swallowed, and worms.

Microscopic Examination of the Stools. The macroscopic examination of the stools affords data sufficiently reliable for clinical work in the great majority of instances. It may, however, lead to erroneous conclusions, especially with regard to the amount of fat and undigested starch. Fatty and starchy stools sometimes appear perfectly normal macroscopically, and only microscopical examination will prevent mistakes. It is advisable, therefore, in all but the plainest cases, to examine the stools microscopically as well as macroscopically. The microscopical examination of the stools is not a difficult procedure and can be carried out in ten minutes or less by anyone accustomed to it.

The feces, if hard, are first rubbed up with a little water. Otherwise they are thoroughly mixed, and three different portions examined. The first is examined in the fresh condition. In this portion any undigested tissues or pathological elements, such as blood, pus and eggs of parasites, can be differentiated. A preliminary estimation of the amount of

neutral fat, fatty acids, soaps and starches can also be made.

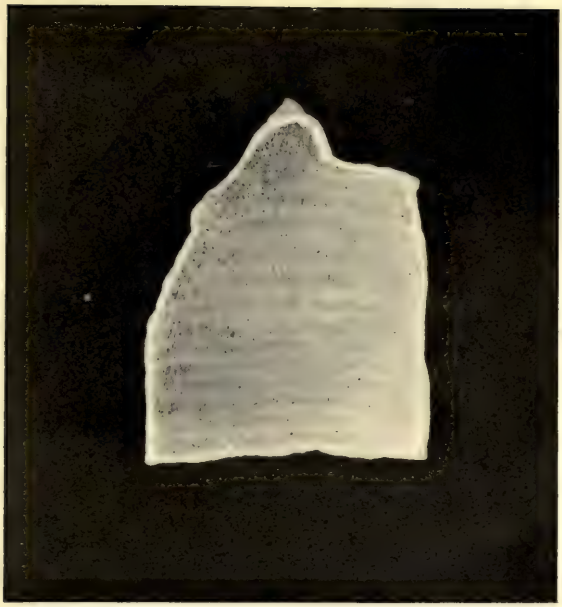
The second portion is stained with Lugol's solution (iodine, 2; potassium iodide, 4; distilled water, 100) and examined for starch. The starch granules stain blue or violet. Certain microbes also stain blue. These, the so-called iodophilic bacteria, are associated with faulty carbohydrate digestion, and, when found alone without other symptoms, are suggestive of an early disturbance in the digestion of the carbohydrates. Before concluding that undigested starch is present, all possibility of contamination with baby powders must be eliminated.

The third portion is stained with a saturated alcoholic solution of Sudan III. The neutral fat drops and fatty acid crystals stain red. Soap crystals do not stain with Sudan III. After this specimen is examined and the microscopic picture is clear, a drop of glacial acetic acid is allowed to run under the coverglass, is thoroughly mixed in, and then heated until it begins to boil. This process turns the soap into neutral fat and fatty acid which will appear as large stained drops and upon cooling crystallize. They usually retain the red stain. Any increase in the amount of fat after the addition of acetic acid indicates the presence of a corresponding amount of soaps. If there are any fat drops visible after the addition of Sudan III and before the addition of acetic acid, another specimen should be stained with a dilute solution of carbolfuchsin (carbolfuchsin sol., 1; water, 4 or 5). With this solution the neutral fat is not stained, while the fatty acids are stained a deep red and the soaps a dull rose-red. Without this stain it is impossible to distinguish neutral fat from fatty acids. An excess of neutral fat indicates that the digestion of fat is not carried on normally; an excess of fatty acids and soaps, that the digestion is normal, but assimilation is abnormal.

It is well to examine the specimen first with a low-power objective and later with a No. 7 objective in order to bring out the detailed structure.

Bacteriologic Examination of the Stools. Our knowledge of the bacteriology of the disturbances of digestion and of

the various inflammatory diseases of the intestine is so limited at present that no conclusions of clinical importance can be drawn from the microscopic examination of the stools, the only exception being, possibly, the presence of large numbers of iodophilic bacteria, which, as already stated, point to disturbance of the digestion of the carbohydrates.



Gown for premature infant.

Premature infant in gown.

SECTION II.

DISEASES OF THE NEW-BORN.

CASE 1. Ruth S. was delivered at 6 A.M., April 6, by high forceps, after a labor lasting twelve hours. The operation was not a difficult one. She was expected May 9. She gasped at once and breathed immediately, but did not cry. She passed both urine and meconium soon after she was born. Her parents were healthy, but frail. There was no known cause for the premature labor. She was seen at 7.30 A.M.

Physical Examination. She was small but well nourished. Her color was good, her skin clear and the surface of the body warm. The heart was normal and the lungs fully expanded. The lower border of the liver was palpable three cm. below the costal border in the nipple line. The spleen was not palpable. There were no deformities. She weighed five pounds.

Diagnosis. The diagnosis is, of course, PREMATURITY. Whatever may be the cause of the prematurity, it is certainly not syphilis.

Prognosis. The prognosis should always be guarded in premature babies. They ought not to be considered out of danger until they are thriving under normal conditions. Her chances are, however, better than the average, because she is only a month premature, weighs five pounds, was born after a short and easy labor and is not syphilitic.

Treatment. She ought not to be bathed, but should be anointed with olive oil. She should be oiled in her crib every other day. This will gradually clean the skin and keep it in good condition. She should not be dressed, but should be wrapped in absorbent cotton, or, better, in a quilted gown with a hood. The gown is made by quilting cotton between two layers of cheesecloth. This protects the baby as well as

cotton alone, and makes the care much easier. Absorbent cotton should be used at first instead of a diaper.

She should be placed in a padded bassinette or basket, the temperature of which should be kept at 90° F., by electric heating pads or hot water bags or bottles. The thermometer by which the temperature of the basket is regulated should be fastened to the front of the gown. Her rectal temperature should be taken two or three times daily. If it is above 99.5° F., the temperature of the basket should be lowered; if it is below normal, it should be raised. The temperature of the room should be kept at 80° F. The air of the room must at the same time, however, be kept fresh. The thermometer by which the temperature of the room is regulated must be hung near the basket, not on the wall many feet from the baby. A sunny room with a fireplace, in which there is a fire, is the best. A padded basket is much preferable to an incubator, because an incubator does not provide a sufficient supply of fresh air, and because the temperature of the air which the baby has to breathe is too high. The baby's vitality and its resistance to infection are lowered by the lack of fresh air. The lack of fresh air increases the liability of infection, and bacteria grow most luxuriantly at the temperature at which the incubator is usually kept.

She should be given a teaspoonful of warm water every two hours until to-morrow morning. She ought not to be put to the breast then, because she is not strong enough to suck well, is not vigorous enough to be handled and is liable to be chilled by the exposure consequent to being taken from her basket. It is even more important, on account of their undeveloped powers of digestion and absorption, for premature babies than for full-term babies to have breast-milk. Their chances of survival are much better on breast-milk than on any modification of cows' milk. She should, therefore, be given a drachm of a mixture of one part of breast-milk and three parts of water every two hours, day and night. If her mother has no milk, a wet nurse should be procured. If breast-milk is not obtainable, she may be given instead a modified milk containing 1% of fat, 5% of milk sugar, 0.25% of whey proteids and 0.25% of casein. This amount of food

is entirely inadequate to cover her caloric needs. There is great danger, however, of disturbing her digestion, if too strong a mixture or too large a quantity is given at first, and it will be very difficult to correct it, if it is disturbed. If she takes and digests her food well, the strength and the amount at a feeding should be rapidly increased, changes being made every day, or even twice a day, if necessary. It must be remembered that premature babies, on account of their small size and their imperfect metabolism, require more calories per kilo than full-term babies, and that, therefore, it is very important to increase the strength and amount of her food as fast as is possible without disturbing her digestion. She is too small to take an ordinary nipple well and probably too feeble to suck vigorously. The milk should, therefore, be given to her in a "Breck Feeder," which is far better than either a spoon or a dropper. The "Breck Feeder" is a graduated glass tube open at both ends. On the smaller end is a nipple, about the size of the rubber of a medicine dropper. This is perforated and goes into her mouth. On the other end is a large finger cot. By squeezing the finger cot the milk can be forced into her mouth and efforts at sucking be aided or induced.

She must not be handled any more than is absolutely necessary. No one should be allowed to see her except those who are taking care of her. It is not necessary to darken the room or to be especially careful about noise, because light and noise will not disturb her at present.

She does not require any stimulation.

CASE 2. John M., the first child of healthy parents, was born at full term after an instrumental labor. He was normal at birth, except for a tumor in the neck. This tumor had not increased in size. He had never been properly fed, had had more or less disturbance of the digestion from the first and had not gained in weight. He was admitted to the Floating Hospital when six weeks old.

Physical Examination. He was fairly developed and nourished. The hair was sparse. The anterior fontanelle was three cm. in diameter and level. The posterior fontanelle was still open. The pupils were equal and reacted to light. The cervical spine was normal. The throat was normal, as were the heart and lungs. The abdomen was full, soft and tympanitic. The lower border of the liver was just palpable in the nipple line, the upper border of dullness being at the fifth rib in the same line. The spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. There was a mass, the size of a small orange, in the left side of the neck. The location is best shown in the accompanying photograph. It was covered with normal skin and was neither hot nor tender. Pressure on it caused no discomfort or diminution in size. It was rounded, but had a definite and relatively small base. It was somewhat fluctuant and evidently contained fluid. The fluctuation was not as marked, however, as would have been expected if the fluid was contained in a single cavity. Several small masses could be felt indistinctly, as well as a number of bands running through it. The rectal temperature was 99.2° F.; the pulse, 126; the respiration, 30.

Diagnosis. The absence of heat, redness and tenderness and the normal temperature show that the tumor cannot be inflammatory in origin, even if this possibility was not excluded by the fact that it was present at birth. The absence of any defect in the cervical spine, the position of the tumor, the absence of all signs of involvement of the spinal cord and the fact that pressure on the tumor causes

JOHN M. Case 2.

no discomfort or diminution in its size exclude a spinal meningocele. The position of the tumor, posteriorly to the sternocleidomastoid muscle, and the fact that it is evidently multilocular rule out a branchial cyst. The only other congenital tumor which occurs in this position is the cystic hygroma. This tumor is situated in the usual position of these tumors, contains fluid and is multilocular. It corresponds, therefore, in all its characteristics to those of a CYSTIC HYGROMA OF THE NECK, and undoubtedly is one.

Prognosis. The tumor will certainly not diminish in size and is not likely to grow any larger. It may, however, become infected and suppurate. It is in no way dangerous to life, but, unless removed, will cause much discomfort and inconvenience.

Treatment. The tumor must, of course, be eventually removed. It will be wise, however, to delay until the baby is older and stronger, because these tumors usually have diverticulæ which extend deep into the neck, the removal of which often makes the operation a long and serious one.

CASE 3. Mary C., the first child of healthy parents, was born at full term, after a normal labor, at 9 P.M., Aug. 21. She appeared normal at birth, except that her abdomen was rather large, and weighed nine pounds. She passed no meconium either during or after the labor. She began to vomit a yellowish-green material soon after birth. The vomiting was not explosive. It was, in fact, more like regurgitation than vomiting, the vomitus often running out of the mouth without any apparent effort. She took the breast well but continued to vomit everything taken. There having been no movement of the bowels, she was given a high enema of a pint of water early in the morning of Aug. 23. Two sticks of smooth, dry, gray feces the size of the finger were obtained. Two doses of castor oil, given that afternoon, were vomited. The temperature remained normal and the abdomen lax until the morning of Aug. 24, although the bowels did not move and the vomiting continued. Distension of the abdomen developed during the morning, however, the temperature rose steadily all day and her general condition grew progressively worse. Another dose of castor oil was vomited. A high enema brought away a small amount of grayish material of the same character as that obtained from the first enema. She was seen in consultation at 5 P.M., Aug. 24.

Physical Examination. She had evidently lost much weight. The face was drawn. There was no jaundice. She was quiet unless disturbed, but every few minutes regurgitated a small amount of yellowish-brown, watery material. The fontanelles were depressed. There was no rigidity of the neck and no neck sign. The pupils were equal and reacted to light. The mouth and throat were not examined. The heart and lungs were normal. The liver and spleen were not palpable. The abdomen was much enlarged and so tense that nothing could be determined by palpation. It was everywhere tympanitic, but apparently not tender. The superficial veins were distended. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. The diapers were wet, but not stained by bile. The rectal temperature was 102.8° F.; the pulse, 172.

Diagnosis. The absence of any physical signs of increased cerebral pressure or meningeal irritation excludes all forms of cerebral disease as the cause of the vomiting and obstipation. Disease of the brain would not, moreover, account for the gray color of the feces. The distension and rise of temperature are undoubtedly due to some complication of the original condition, the symptoms of which are vomiting and obstipation. The early onset and the persistence of the vomiting, taken in connection with the absence of meconium, the small amount of intestinal contents obtained by enemata and the absence of all signs of inflammation in the abdomen and of fever until this morning show conclusively that there is some congenital obstruction of the digestive tract. The amount of the vomitus, the character of the vomiting, the presence of bile in the vomitus, the absence of bile in the intestinal contents and the absence of jaundice and bile in the urine prove that the obstruction is situated below the entrance of the common bile duct into the duodenum. The fact that a soft rubber catheter could be passed well into the intestine and that a pint of water could be injected at one time shows that the obstruction must be located above the large intestine. It is impossible, however, to determine in what part of the small intestine below the duodenum the obstruction is located. It is probable, however, judging from the small amount of intestinal contents obtained, that it is situated in the lower portion of the ileum. While it is possible that the obstruction may be due to constriction by a band or peritoneal adhesions, the chances are very much in favor of a CONGENITAL MALFORMATION OF THE INTESTINE.

The distension and fever are almost certainly the result of a complicating peritonitis as the result of infection.

Prognosis. The outlook is practically hopeless. There is a small chance of finding some condition, like obstruction from a band or adhesions, which can be relieved. Even so, however, the complicating peritonitis will probably prove fatal. In all probability, however, the obstruction is due to some irremediable malformation of the intestine.

Treatment. There is no possible hope of recovery without an operation. An exploratory laparotomy should, therefore, be done at once.

CASE 4. Martha R., the third child of healthy parents, was born at full term after a normal labor and was apparently normal at birth. She was seen when three and a half months old. She was breast-fed entirely for two weeks, given one part of whole milk and two parts of water in addition for two months, then milk and water alone. Her weight at birth was not known, but she had evidently gained a little. The movements had been whitish in color from the first. Jaundice was first noticed when she was ten or twelve days old and had persisted, with a certain amount of increase, ever since. It was thought that the urine was light-colored in the beginning, but that it very soon became greenish and had so continued. The abdomen was large at birth and had so remained. The baby had seemed fairly well on the whole, but had vomited occasionally and had had two loose white movements daily. It was thought that she had had a little fever from time to time.

Physical Examination. She was fairly developed and nourished. There was marked jaundice of the skin, mucous membranes and conjunctivæ. The anterior fontanelle was 4 cm. in diameter and level. She was perfectly intelligent. The mouth and throat were normal, and there were no snuffles. There was no rosary. The heart and lungs were normal. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line. The lower border of the liver was palpable, running from the right anterior superior spine to the left costal border in the nipple line. The notch was indistinctly palpable in the median line; the edge was a little rounded, the surface smooth. The gall bladder was not felt. The spleen was palpable, running out from beneath the costal border in the anterior axillary line, downward to the level of the navel, and backward and upward under the ribs in the posterior axillary line. It extended 4 cm. below the costal border and was 6 cm. wide. There was a moderate-sized umbilical hernia. There were no signs of fluid in the abdomen and no other masses were felt. The abdomen was not distended, except by the enlarged liver and spleen. Rectal examination was negative. The cervical lymph nodes were slightly enlarged; the axillary and inguinal were not.

There was a slight intertrigo about the buttocks and genitals, but no lesions of scratching. There were no mucous patches and no scars of any old eruption. The extremities were normal. The weight was nine pounds.

The urine was greenish in color, of a specific gravity of 1,009, and acid in reaction. It contained no albumin but considerable bile.

The stools were somewhat loose, grayish-white in color, foul in odor. Examination by the corrosive sublimate test showed a total absence of bile.

Diagnosis. The history, physical examination, urine and stools together present such a characteristic picture of CONGENITAL OBLITERATION OF THE BILE DUCTS that a differential diagnosis is hardly necessary. The only other things to be considered as possibilities are congenital syphilis and duodenal indigestion. Enlargement of the liver and spleen, sometimes accompanied by jaundice, do occur in congenital syphilis. The absence of bile in the stools and of other signs of syphilis, such as snuffles, mucous patches and the scars of old eruptions, exclude it in this instance. Duodenal indigestion is extremely unusual at this age, the liver but little enlarged, the spleen not at all. It can, therefore, also be ruled out. An important point to be remembered in this connection is the fact that there is a colorless form of bile, leucohydrobilirubin. It is never safe, therefore, to conclude absolutely, without a chemical test, that a stool does not contain bile, even if it is white or clay-colored.

Prognosis. The prognosis is absolutely hopeless. No case has lived to be more than eight months old. Death occurs from debility, secondary hemorrhage or intercurrent disease.

Treatment. There is no curative treatment. The patients probably live longer and certainly digest better and are more comfortable, however, if fat is eliminated from their food.

CASE 5. Robert R., the first child of healthy parents, had always been very well. He had been entirely breast-fed, had never had a cough and had not cried more than a normal baby should. When he was about three months old his mother noticed a bunch in the right groin. She had not seen it before, but could not say whether it had been there before or not. She thought that it had increased a little in size since she first discovered it. It apparently caused the baby no discomfort. He was seen in consultation a week after the discovery of the tumor.

Physical Examination. He was in splendid general condition, large, fat and of good color. The fontanelle was level. There was no rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes.

There was a slightly elastic swelling, about the size and shape of a catbird's egg, in the right inguinal region just above the entrance to the scrotum. It was not tender, hot or red. It could be pushed upward and downward en masse, but could not be pushed into either the abdomen or the scrotum. It did not gurgle. The inguinal rings felt alike on both sides, and nothing could be felt in them. Both testicles were in the scrotum.

Diagnosis. The history is unimportant in this instance. Babies often develop an inguinal hernia without cough or excessive crying and the mother does not know whether the swelling was present at birth or appeared later. The diagnosis must be made entirely on the physical examination. A partially descended testicle can be ruled out because both testicles are in the scrotum. The elasticity rules out a hyperplastic lymph node. It is, moreover, very unusual to find only one enlarged lymph node in the groin, and a large lymph node is seldom so movable. The normal condition of the inguinal ring rules out hernia. The absence of gurgling and the irreducibility of the mass are corroborative evidence

against hernia. The shape, elasticity, mobility and irreducibility are characteristic of an ENCYSTED HYDROCELE OF THE CORD, which is the diagnosis.

Prognosis. There is, of course, nothing dangerous about this condition. A single tapping usually cures it.

Treatment. The treatment is aspiration with a fine needle. One tapping will probably cure it. If it does not, the tapping may be repeated. An operation will almost certainly not be necessary.

CASE 6. Harriott H., the first child of healthy parents, was born at full-term after a difficult forceps delivery, and weighed eight pounds. She breathed at once and seemed normal in every way except that her head was much swollen and out of shape. The general swelling went down in twenty-four hours and then a circumscribed swelling was noticed on the right side of the head. This had diminished a little in size and had apparently caused her no discomfort. She had seemed normal in every way except for the swelling on the head. She was seen in consultation when a week old.

Physical Examination. She was well developed and nourished and of good color. There was a swelling, the size of a duck's egg, over the right parietal bone. This swelling was soft and fluctuating, but neither red nor tender. Pressure on it caused no bulging of the anterior fontanelle and no discomfort or signs of increased cerebral pressure. It did not extend beyond the borders of the right parietal bone. The pupils were equal and reacted to light. There was no rigidity of the neck. The anterior fontanelle was level. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal; there was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign.

Diagnosis. This tumor corresponds in every way to a CEPHALHEMATOMA and undoubtedly is one. The caput succedaneum is hard, does not fluctuate and is not limited to a single bone. It disappears in from twenty-four to forty-eight hours. The swelling first noticed in this instance was undoubtedly a caput. A meningocele protrudes through one of the normal openings in the skull, a fontanelle or suture, and is most often situated at the root of the nose or in the occipital region. Pressure on it causes bulging of the anterior fontanelle, discomfort and symptoms of increased cerebral pressure, such as spasm or twitching of the extremities. An abscess is hot, red and tender, and is accompanied by fever and symptoms of general constitutional disturbance.

Prognosis. The prognosis is absolutely good if the tumor is let alone. It is sure to disappear in from three to six weeks.

HARRIOTT H. Case 6.

Multiple Cephalhematoma.

If it is aspirated or opened it may become infected and an abscess result.

Treatment. The treatment is to let it alone. External applications cannot hasten the absorption of the blood. Aspiration will hasten the disappearance of the tumor, but is unnecessary and carries with it the danger of infection. An incision is unnecessary, will leave a scar and is very likely to result in infection and the formation of an abscess.

CASE 7. William P. was the second child of healthy parents. The position was O. D. P. He was delivered by high forceps and weighed eleven pounds. The physician in charge pulled very hard on one shoulder, probably the right, during the delivery, and thought that he felt something give way. The baby was somewhat white at birth, did not respond to artificial respiration, and mouth-to-mouth insufflation was necessary. He then cried and seemed perfectly normal except that it was noticed at once that there was some trouble with the face and the right arm. He did not close the right eye and there was no motion of the right side of the face. The right arm hung limp at the side and was used but little. There had been some improvement in the condition of both face and arm. He was seen in consultation when one week old. He was not nursed, but took the bottle well and had no disturbance of digestion.

Physical Examination. He was well-developed and nourished. His color was good. The fontanelle was 3 cm. in diameter and level. The head was of good shape. There was no rigidity of the neck. There was a hemorrhage into the right conjunctiva. The pupils were equal and reacted to light. The left eye could be closed entirely; the right only partially. The mouth was drawn to the left when he cried. There were forceps scars on the left forehead, but none on the right. The heart and lungs showed nothing abnormal. The level of the abdomen was that of the thorax. The cord was still on, but was healthy. The liver was palpable 3 cm. below the costal border in the nipple line; the spleen was not palpable. The genitals were normal. The right arm hung limply by the side, extended at the elbow and wrist, and with the palm turned backward. He made no active motions with this arm except at the wrist and with the fingers. His grip was strong. Passive motions were not limited. The arm was not tender, and there were no evidences of fracture or dislocation. The left arm and the legs were normal and showed no signs of spasm or paralysis. The knee-jerks were equal and lively. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The rectal temperature was normal.

Diagnosis. The diagnosis of facial paralysis is evident. The inability to close the eye shows that the upper branch of the facial nerve is involved and that the paralysis is, therefore, peripheral in origin. It was undoubtedly caused by the pressure of the forceps blade on the trunk of the nerve. The hemorrhage into the right conjunctiva is presumably also due to injury from the forceps blade.

The flaccidity of the right arm at once rules out cerebral paralysis, in which the paralysis is spastic. Moreover, in cerebral paralysis due to injury at birth, the paralysis is never limited to one extremity, and if an extremity is affected, it is always affected as a whole, not in part. If the baby was older, infantile paralysis (poliomyelitis) might be considered, but, as the paralysis was present at birth, this is an impossibility. It corresponds perfectly to the so-called "obstetric paralysis" of the upper-arm type, in which there is a paralysis of certain muscles from injury to the brachial plexus during labor. The stretching of the plexus caused by the pulling on the shoulder was presumably the cause in this instance. The characteristic position of the arm is due to the fact that only certain muscles are involved, namely, the deltoid, biceps, brachialis anticus, supinator longus, infraspinatus, supraspinatus and serratus magnus.

This baby, therefore, shows both the facial and arm types of Obstetric Paralysis.

Prognosis. The prognosis of the facial paralysis is almost absolutely good. Recovery almost invariably takes place in a few weeks.

The prognosis of the paralysis of the arm is not as good. There will certainly be a great deal of improvement, but equally certainly some permanent disability. How great this disability will be cannot be told for a year or two, after which time little improvement can be expected.

Treatment. The facial paralysis requires no treatment. The only treatment indicated for the arm at present is a sling to take the weight of the arm off the shoulder muscles. Massage and electricity may be begun in about three weeks. The object of them both is to keep up the tone of the muscles until the nerves regain their power. Faradism should be

used, if the muscles react; if they do not, galvanism. If, at the end of a year, there has been but little improvement, operation on the nerve trunks will be worthy of consideration.

The results of this operation have been, in a number of instances, very satisfactory. It is, however, a delicate operation and should be performed only by those accustomed to the surgery of the nerves.

Obstetric Paralysis. — Facial type. Case 7.

Obstetric Paralysis. — Arm type. Case 7.

CASE 8. Marion S. was the first child of healthy parents. There had been no miscarriages. She was born at full term, after a moderately hard forceps delivery, and weighed seven pounds. Nothing abnormal was noticed about her at birth. She was not nursed, but was at once given modified cows' milk, on which she had done very well. A lump was noticed in her neck when she was four and one-half weeks old. Both her mother and the nurse were positive that there had been no lump there before. There had been no evidence of pain or tenderness in the neck and the swelling apparently caused her no inconvenience. She was seen when five weeks old.

Physical Examination. She was well developed and nourished and of good color. The posterior fontanelle was closed; the anterior, three cm. in diameter and level. She held her head straight and moved it freely in all directions without pain. There was a hard, non-tender bunch, the size of an almond, in the lower third of the sternal portion of the right sternocleidomastoid muscle, and the lower third of the clavicular portion was thickened and hard, but not tender. The swellings were not red or hot. The skin and subcutaneous tissues were freely moveable over them. The mouth and throat were normal. The heart, lungs, abdomen and extremities were normal, as were the deep reflexes. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. There was no enlargement of the peripheral lymph nodes. There was no nasal discharge and no eruption on the skin. The rectal temperature was normal.

Diagnosis. The tumor and thickening are distinctly within the sheath of the sternocleidomastoid muscle. They cannot, therefore, be due to enlarged cervical lymph nodes or connected with the thyroid gland, as was supposed by the former attendant. Tumors and thickening of the sternocleidomastoid muscle in early infancy are almost invariably the result of a hemorrhage into the muscle during labor. Other causes, such as syphilis and malignant disease, are so extremely unusual that it is not necessary to consider them. The physician in charge did not notice anything abnormal at birth, however, and the mother and nurse affirm that the

tumor did not appear until the baby was more than four weeks old. These statements do not appear consistent with the diagnosis of hematoma of the sternocleidomastoid muscle, a condition which develops at birth. It is easy to explain them, however, when it is remembered that the effusion is at first liquid and very easily overlooked unless there is tenderness. The tumor is usually overlooked, therefore, until it becomes hard from the organization of the clot and the formation of scar tissue, unless the unusual position of the head, which is turned a little downward and toward the affected side, calls attention to it. In this instance the mother and nurse were probably also poor observers. The statements as to the late appearance of the tumor do not, therefore, invalidate in any way the diagnosis of HEMATOMA OF THE STERNOCLEIDOMASTOID MUSCLE.

Prognosis. The lesions in this instance are relatively slight and there is no deformity or limitation of motion. It is practically certain, therefore, that resolution will gradually take place and that there will not be sufficient retraction of the newly-formed tissue to cause torticollis. It will probably be a year before the swelling will entirely disappear.

Treatment. Passive motion of the head to prevent contracture of the muscle should be made regularly. Massage of the thickened areas will probably hasten resolution.

CASE 9. Catherine E. was delivered at full-term by low forceps after a long labor, and weighed nine pounds. Her mother had been married twice. Her only pregnancy by her first husband had resulted in a miscarriage at two or three months, after an accident. She thought that he had not had syphilis and had had no symptoms of it herself. Her second husband denied having had syphilis. The patient was the first child by the second husband. She is said to have cried vigorously immediately after birth. The nurse noticed, a few hours later, however, that she did not breathe naturally. The trouble with the breathing continued. When quiet, she breathed quickly and her color was fair. If disturbed, or if she made any exertion, she usually became very cyanotic. Sometimes she at first became very pale and then cyanotic. She seldom cried. The respiration was never noisy. She usually kept her mouth shut and was able to suck. She had apparently never had any fever and had never had any disturbance of the digestion. She was seen in consultation when about five weeks old.

Physical Examination. She was fairly developed and nourished. When quiet, she breathed quickly but quietly. The alæ nasi did not move, she kept her mouth shut and her color was good. There was, however, moderate retraction of the epigastrium and of the sides of the chest. When disturbed, the respiration became more rapid and labored, but not noisy. She kept her mouth open and was evidently distressed. She tried to cry but was unable to make much noise. She became very cyanotic, and the retraction of the epigastrium and sides of the chest was much increased. A probe was easily passed through both nostrils. There were no snuffles. The throat was normal both to inspection and palpation and no adenoids were felt with the finger. There was no increase of the thymus dullness, and the thymus could not be felt in the suprasternal notch. The cardiac impulse was indistinctly palpable in the fourth left space 5½ cm. to the left of the median line. The right border of dullness was 2 cm. to the right of the median line. The action was regular; the rate varied between 140 and 180 according to the difficulty in breathing. The sounds were normal in

character and there were no murmurs. There was marked dullness and diminished broncho-vesicular (much nearer vesicular than bronchial) respiration, with an occasional medium moist râle in the left front down to the cardiac area and in the upper left axilla, and over the whole right back except at the apex. There was hyperresonance and exaggerated vesicular respiration over the rest of the lungs, and numerous fine moist râles were heard. The abdomen was normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was no eruption and no scars of any old eruption. There were no mucous patches about the anus. The rectal temperature was normal.

Diagnosis. The problem is to find the cause of the difficulty in respiration and cyanosis. This cause is the diagnosis. The physical examination rules out obstruction in the nose, nasopharynx, pharynx and larynx, as well as pressure from an enlarged thymus. The heart shows nothing abnormal. Sometimes, however, the examination of the heart shows nothing abnormal in congenital heart disease even when there are marked symptoms. The signs in the lungs are so definite in this instance, however, that it is not necessary to take refuge in this explanation. The signs in the lungs show partial solidification. The possible explanations of this solidification are resolving pneumonia, syphilis of the lung and congenital atelectasis.

Resolving pneumonia is mentioned merely because this was the diagnosis of another consultant. It can at once be ruled out because there was never any fever and the symptoms appeared within a few hours after birth. Syphilitic involvement of the lung sufficient to give such marked physical signs is very unusual and is found only in the severest cases in which there are many other signs of the disease. The negative family history and the lack of any other signs of syphilis rule it out in this instance. The early appearance and the persistence of the symptoms without fever are most

characteristic of atelectasis. The only point against it is that the baby is said to have cried vigorously at birth. This may have been an error of observation, but, if true, does not rule out atelectasis, because it is perfectly possible for a baby to cry loudly and yet not completely expand the lungs. The diagnosis is, therefore, CONGENITAL ATELECTASIS. The fine moist râles heard over the rest of the lungs are undoubtedly due to edema.

Prognosis. The prognosis is very grave. There is very little chance of expansion of the atelectatic areas after five weeks, and the child cannot live long in its present condition.

Treatment. There is no direct treatment for the atelectasis. The best that can be done is to feed the baby carefully, give it plenty of fresh air, administer oxygen when there is cyanosis, and stimulate it, if necessary.

CASE 10. Roger S. was seen in consultation when three months old. He was the fifth child and was born at full term after a normal vertex labor. He was perfectly normal at birth, but when he was two days old it was noticed that he had some difficulty in breathing. This difficulty gradually increased for about three weeks, since when it had remained about the same. Inspiration was always noisy, whether he was awake or asleep. It was noisier when he was excited and when he was lying down, especially if he lay on his face. Expiration was quiet. He never became blue and never held his breath. His cry was always clear and he almost never coughed. He had at times a little difficulty in taking food. He was partly breast- and partly bottle-fed. His digestion had always been perfect and he had gained steadily in weight.

Physical Examination. He was well developed and nourished, but a little flabby. He was somewhat pale, but not at all cyanotic. Inspiration was always accompanied by a crowing sound, which was more marked when he was frightened or excited. This noise was louder when he was lying down than when he was sitting up. He seemed uncomfortable when lying on his face. Expiration was perfectly quiet. His mouth was usually open, but the crowing sound was no louder and respiration was no more difficult when it was closed. His cry was perfectly clear. There was slight retraction of the epigastrium with almost every inspiration. This was more marked and was accompanied by marked retraction of the suprasternal and supraclavicular spaces when the crowing was louder. He was not at all cyanotic even when the crowing sound was the loudest. The anterior fontanelle was 4 cm. in diameter and level. The shape of the head was good. There was no craniotabes. The fauces, pharynx and nasopharynx showed nothing abnormal on either inspection or palpation. The thymic dullness was not increased and the thymus could not be felt in the suprasternal notch. The heart and lungs were normal. The chest was slightly flattened on the sides and the sternum was a little prominent. There was a moderate rosary. The abdomen was rather large, but otherwise normal. The lower border of

the liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal, but not very lively. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. Trousseau's sign and the facial phenomenon were absent.

Diagnosis. Laryngismus stridulus can be excluded at once because the crowing sound is continuous. Other less important points against laryngismus stridulus are the early onset and the absence of other signs of increased nervous irritability (Trousseau's sign, facial phenomenon, exaggerated reflexes). Obstruction in the nose, nasopharynx and pharynx is excluded by the physical examination. Obstruction from pressure on the trachea by enlarged bronchial glands, new growths in the mediastinum or an enlarged thymus is excluded by the fact that the interference is entirely with inspiration. The sound resulting from obstruction in this locality is, moreover, not crowing in character. It cannot be due to obstruction within the larynx from inflammation or new growths, because the cry is clear and there is no cough. The obstruction must be, therefore, at the entrance of the larynx. The anatomical malformation which can produce this obstruction is a narrowing of the epiglottis with laxness of the ary-epiglottidean folds. This condition was found by laryngoscopic examination in this patient. The result of this condition, noisy inspiration, is known as CONGENITAL LARYNGEAL STRIDOR.

Prognosis. The prognosis is good, both as to life and recovery. The deformity disappears with the growth of the parts and the crowing gradually diminishes and finally ceases toward the end of the second year.

Treatment. Nothing can be done to hasten the growth of the parts. It is important, however, to avoid, as far as possible, catarrhal processes in the respiratory tract.

CASE 11. Marjorie D. was seen in consultation when four days old. She was the second child of healthy parents, was born at full term after a normal, rapid labor, and weighed seven and one-quarter pounds. The older child was well and there had been no miscarriages. She seemed normal at birth, except that there was much mucus in the nose and throat, which was removed with considerable difficulty. There continued to be a profuse discharge of mucus, which at times accumulated and caused severe suffocative attacks, relieved only by the mechanical clearing of the nose and throat. There was a constant rattling in the nose and throat between these attacks. Her cry was somewhat feeble and a little hoarse. Her mother's milk had appeared on the third day and seemed sufficient in quantity. She took the breast well, but was liable to have an attack of suffocation come on while nursing. At times she vomited during or immediately after nursing; at others, she retained several successive feedings without vomiting. The stools were still composed entirely of meconium. She passed urine, but infrequently and in small amounts. The rectal temperature had been normal. She had lost one pound in weight.

Physical Examination. She was fairly developed and nourished. She was slightly jaundiced, but there was no cyanosis. There was no bulging of the fontanelles. She was sleeping quietly, but with a little rattling in the nose. Closing the mouth did not interfere with breathing or wake her up. A probe was easily passed through both nostrils. When the tongue was depressed a large amount of yellowish-white liquid, mixed with mucus, came up in the throat. When this was cleaned out and the operation repeated more of the same material appeared. Palpation of the throat showed nothing abnormal. Her cry was a little hoarse, but strong. There was no retraction anywhere. The heart, lungs and abdomen were normal. The stump of the cord was healthy. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and

normal. Kernig's sign was absent. She took the breast well, swallowed without difficulty, nursed about five minutes and did not vomit.

Diagnosis. The suffocative attacks are undoubtedly due to the collection of mucus in the nasopharynx. Why does this mucus collect and why was it present in such large quantities at birth? Is it because there is an excessive secretion as the result of some local irritation or is it because the secretion is not swallowed? A strong point against the existence of an excessive secretion from local irritation is the fact that the mucus was present in large amounts at birth. On the other hand, the child swallows milk, and, if it swallows milk, ought to be able to swallow mucus also. The material which comes up in the throat when the tongue is depressed looks like colostrum or thin pus, mixed with mucus. It is hard to believe it pus, when it is taken into consideration that the baby is only four days old, shows no evidences of infection and has always had a normal temperature and that there are no signs of an abscess from which the pus can come. It hardly seems possible, on the other hand, that it can be colostrum, because she nurses and swallows well, and, according to the history, has at times taken several successive feedings without vomiting. It is possible, however, that she may not have taken as much at these feedings as was supposed, that although she swallows well she gets but little and that this little does not reach the stomach but accumulates in the esophagus. The persistence of the meconium-like stools also points to some obstruction to the entrance of milk into the gastrointestinal canal. A reasonable explanation of the symptoms is, therefore, that there is a malformation of the esophagus which does not interfere with swallowing but prevents the passage of mucus and milk into the stomach, that the suffocative attacks are due to the accumulation of mucus in the pharynx, that not as much milk is taken as was supposed, that several small feedings accumulate in the upper esophagus, that the accumulated material is forced up when the tongue is depressed and vomited when the reservoir is overfilled. It is easy to prove whether this explanation is correct or not by examining the material which comes up in

the throat, and, if it proves to be milk, by passing a soft rubber catheter into the esophagus.

The material from the throat contains many colostrum corpuscles, much mucus and no more leucocytes than are normally found in the colostrum. The catheter is easily introduced into the esophagus but meets an obstruction about four inches from the gums and can be passed no further. There is no doubt, therefore, that the symptoms are due to a CONGENITAL MALFORMATION OF THE ESOPHAGUS. This malformation is situated at about the junction of the upper and middle thirds, and is, judging from the usual condition in these cases, presumably an obliteration of the esophagus at this point. There is, for the same reason, probably an opening between the trachea and the lower portion of the esophagus.

Prognosis. The prognosis is absolutely hopeless. The baby will die of starvation in a few days no matter what method of treatment is pursued.

Treatment. The condition is irremediable. Surgical intervention is impossible. Life may be prolonged a little by rectal feeding and the subcutaneous injection of salt solution, but these measures can only postpone the fatal outcome a few days or possibly a week.

CASE 12. Eleanor S. was the fourth child of healthy parents. She was born at full term, after a normal labor, was normal at birth and weighed eight pounds. She was entirely breast-fed and had done well in every way, except that she had rather too many movements. Enlargement of the breasts began when she was four or five days old and increased, so that when she was ten days old they were much enlarged. There having been no diminution in the size of the breasts, she was brought on that account when three weeks old.

Physical Examination. She was well developed and nourished and of good color. The posterior fontanelle was still open; the anterior fontanelle was level. The mouth was healthy. The heart, lungs and abdomen showed nothing abnormal. The navel was normal. The lower border of the liver was palpable one cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm, paralysis or disturbance of the deep reflexes. There was no enlargement of the peripheral lymph nodes. Both breasts were markedly swollen, the area at the base being about that of a fifty-cent piece and the shape that of the engorged breast in the adult. They were not red, hot or tender. A milky fluid could be easily expressed from them. The rectal temperature was 99° F.

Diagnosis. The normal temperature and the absence of heat, redness and tenderness prove that there is no inflammation of the breasts. The condition ought not, therefore, to be called "mastitis," as it usually is. It is simply a PHYSIOLOGICAL ENGORGEMENT OF THE BREASTS, presumably due to the passage into the fetus of some of the hormones circulating in the blood of the mother. These stimulate the production of milk in the child as well as in the mother.

Prognosis. The secretion of milk will gradually cease and the enlargement of the breasts subside. There is no danger of the development of mastitis if the breasts are let alone. If they are handled or squeezed, they may become inflamed.

Treatment. The treatment is to let the breasts entirely alone.

CASE 13. Sidney K. was the first child of healthy parents. There was no history of syphilis and there had been no miscarriages. He was born May 28, about a week premature. He weighed six pounds and was put at once on a weak modified milk. Jaundice developed on the second day and became very marked. He took his food well and had not vomited. The movements consisted at first of meconium; later the bowels were very constipated, but the movements were yellow and smooth. The temperature was normal or slightly subnormal. The urine had not stained the diapers. He was seen in consultation June 5, when eight days old.

Physical Examination. He was small and somewhat emaciated, having lost a pound. There was deep jaundice of the skin and conjunctivæ. He did not seem especially feeble. The fontanelle was level. The mouth and throat were normal. The heart, lungs and abdomen were normal. The umbilicus was healed. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal; there was no spasm or paralysis; the knee-jerks were equal and normal. The genitals were normal. There were no ulcerations about the anus. There was no eruption or enlargement of the peripheral lymph nodes. The rectal temperature was normal.

The urine was not examined, but the diapers were not stained by it.

The movements were small, constipated, brownish-yellow and well-digested.

Diagnosis. When jaundice develops during the first few days of life it is always a temptation to call it icterus neonatorum and to dismiss it without further consideration. There are other causes of jaundice at this age, however, and while a snap diagnosis of icterus neonatorum will be correct in the vast majority of cases, it will occasionally be wrong, and wrong often enough to justify a careful differential diagnosis in every instance. The diseases to be considered are, septic infection of the newborn, congenital obstruction or obliteration of the bile ducts, acute duodenal indigestion, congenital syphilis and congenital icterus.

The early appearance of the jaundice, the presence of deep

jaundice without cyanosis, the good general condition and the absence of fever and of enlargement of the liver and spleen rule out septic infection of the newborn. The absence of enlargement of the liver and spleen and of bile in the urine, together with the presence of bile in the stools, rule out congenital obliteration of the bile ducts. Acute duodenal indigestion is very uncommon at this age. It is excluded by the absence of bile in the urine and the presence of bile in the stools. Congenital syphilis is suggested by the prematurity. There are, however, other causes for prematurity than syphilis. The good family history and the absence of miscarriages are against it. The normal size of the liver and spleen, together with the absence of all signs of syphilis, rule it out. Congenital icterus is an extremely rare condition and is excluded because the jaundice was not present at birth and the spleen is not enlarged. The diagnosis by exclusion is, therefore, ICTERUS NEONATORUM. The development of the jaundice on the second day, the good general condition, the presence of bile in the stools, its absence in the urine, the normal temperature and the absence of enlargement of the liver and spleen are all consistent with this diagnosis.

Prognosis. Icterus neonatorum does not affect the general condition. The jaundice will probably not increase in intensity, but will not disappear entirely for several weeks.

Treatment. No treatment is indicated. Icterus neonatorum is a physiological condition and is due to the mere mechanical difficulty which the bile encounters in passing through the bile capillaries. There is, therefore, no object in giving cathartics. Cleaning out the intestine cannot affect the conditions in the bile capillaries. It has been shown that calomel, like the other so-called "cholagogues," does not increase the flow of bile. If it did, it would be contraindicated rather than indicated in this condition. There is no indication for changing the food, because sufficient bile to carry on digestion enters the intestine, only the excess passing into the circulation.

CASE 14. Robert M. was the third child of healthy parents. The other children were well and there had been no miscarriages. He was born at full term, after a normal labor, and appeared normal at birth. He was given at first a weak mixture of condensed milk and water. This did not agree with him and he was then given barley water for a few days, and after that a number of proprietary foods in rapid succession, all of them being prepared with water. He had vomited a great deal from the first and the stools, although not increased in number above the normal, had always been green and usually undigested. He had lost weight steadily. He had several convulsions October 9. Two days later he suddenly became very feeble and since that time had taken almost no nourishment. He was admitted to the Children's Hospital, October 14, when six weeks old.

Physical Examination. He was poorly developed and emaciated. The skin was pale, with slight cyanosis of the lips and nails. The surface of the body was cold. He was extremely feeble, was unable to cry aloud and seldom opened his eyes. The anterior fontanelle was two cm. in diameter and depressed; the posterior was closed. The bones of the skull overlapped. The mouth and pharynx were dry. The respiration was very shallow. The cardiac impulse was neither visible nor palpable. The cardiac area was normal. The action was irregular and the sounds feeble. There were no murmurs. The lungs showed nothing abnormal. The abdomen was full and tympanitic, but otherwise normal. The liver and spleen were not palpable. The genitals were normal. Both cheeks were somewhat indurated. There was marked induration of the whole of the back and of both upper and lower extremities, except that the palms and soles were not involved. There was no pitting on pressure. The color of the indurated areas was slightly yellowish. He was so rigid that when he was lifted from the bed by a hand placed under his back there was no change in his position. He did not move his extremities, but a certain amount of passive motion could be elicited with some difficulty. The character of the knee-jerk could not be determined, because of the rigidity. The rectal temperature was

94.2° F., the pulse could not be obtained, the respiration was 50.

Diagnosis. The diagnosis of SCLEREMA NEONATORUM is so evident in this instance that it is hardly necessary to consider any other condition. The distribution of the induration, the color of the indurated areas, the absence of pitting on pressure and the sparing of the palms, soles and external genitals are all characteristic of this condition and distinguish it from edema, in which the color is pale, there is pitting on pressure and the palms, soles and genitals are involved. The low temperature is also characteristic of sclerema neonatorum. It is seldom much below normal in edema.

Prognosis. The prognosis is practically hopeless. He will probably not live more than twenty-four hours.

Treatment. He should be wrapped in cotton, placed in a padded crib or basket and surrounded by heaters or, better, electric heating pads. In fact, the same measures should be used to keep up his temperature as are employed in the case of premature infants (see Case 1). The best food for him is human milk, diluted with an equal amount of water and given with a dropper or Breck feeder. He will probably not be able to take more than half an ounce every one and one-half hours. If human milk is not obtainable, a modification of cows' milk, containing 1% of fat, 5% of milk sugar, 0.50% of whey proteids and 0.25% of casein, with lime water 25% of the milk and cream in the mixture, may be substituted. He should also be given $\frac{1}{500}$ of a grain of strychnia every three hours, supplemented, if necessary, by caffeine-sodium benzoate or salicylate in doses of one eighth of a grain.

CASE 15. Ursula M., the first child of healthy parents, was born at full term, September 23, after a normal labor, and was normal at birth. She had been breast-fed and, except for considerable colic, had done well. The cord came off on the sixth day. The navel was healthy and continued dry until October 3. There had been since then, however, a thin, purulent discharge from the navel. She was seen October 6.

Physical Examination. — She was small, but was developed and nourished, and of good color. The fontanelle was level. The mouth was healthy. The heart and lungs were normal. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen showed nothing abnormal, except at the navel. There was a tumor, the size of a small pea, at the bottom of the navel, which was normally sunken. This tumor looked like a mass of granulation tissue. There was a small amount of thin purulent discharge from it. Careful examination with a probe failed to disclose any canal in it. The extremities were normal. There were no mucous patches about the anus and there was no eruption on the skin. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99° F.

Diagnosis. The absence of a central canal in the mass at the navel and the fact that the discharge is purulent, rather than thin and watery or fecal, shows that it cannot be a prolapse of Meckel's diverticulum. Patency of the urachus is almost never accompanied by the presence of a tumor. The absence of a central canal and of a discharge of urine from it shows that this mass cannot be connected with the urachus. The good family history and the absence of all other evidences of syphilis show that it cannot be syphilitic in nature. It is undoubtedly merely a mass of granulation tissue, which has formed as the result of the imperfect healing of the navel; that is, it is a GRANULOMA OF THE NAVEL.

Prognosis. If it is untreated, it is likely to persist for several weeks, or even months, and will very probably increase in size. It will disappear in a few days, however, if properly treated.

Treatment. It will undoubtedly dry up and disappear in one or two weeks, if it is kept dry and powdered with aristol. It will dry up much quicker, however, if it is touched daily with a stick of nitrate of silver. If it does not dry up in a few days under treatment with the nitrate of silver stick, a small ligature should be tied about its base, or it may be snipped off with the scissors and the base treated with nitrate of silver or the actual cautery. Ligation is, however, the simpler and therefore the preferable procedure.

CASE 16. Catherine G. was born at full term after a normal labor. She was normal at birth, except for a projecting red mass, about the size of the cord, at the navel. This mass was left after the cord came off and had not changed in size since then. It bled freely when irritated, and there was a dark-colored, foul-smelling discharge from it. She had been breast-fed, had had no disturbances of digestion, had gained steadily in weight and had seemed perfectly well except for the mass at the navel. She was admitted to the Infants' Hospital when a month old.

Physical Examination. She was well developed and nourished and of good color. The posterior fontanelle was almost closed, the anterior was three cm. in diameter and level. The mouth and throat were normal. There was no rosary. The heart and lungs were normal. The level of the abdomen was a little above that of the thorax. It showed nothing abnormal except a tumor at the navel. This tumor protruded from the umbilical ring, was one inch long and one-half inch in diameter. Its surface was covered with mucous membrane, which was bleeding from many small points. The centre of its apex was occupied by a canal, also lined with mucous membrane, which admitted a probe two inches. There was a small amount of thin grayish-yellow discharge, with a slightly fecal odor, from the opening. There was no evidence of inflammation about the navel. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

Diagnosis. This tumor is too large to be a granuloma. It is, moreover, covered with mucous membrane and has a central canal, conditions not consistent with a granuloma. The discharge from the central canal is certainly not urine. Patency and protrusion of the urachus can, therefore, be excluded. The characteristics of the discharge are those of the contents of the small intestine. The facts that the surface of the tumor is covered with mucous membrane,

that it has a central canal and that there is a discharge of material from it resembling the contents of the small intestine, justify the diagnosis of persistence, protrusion and eversion of the omphalomesenteric duct. This condition is, however, more often spoken of as PROLAPSE OF MECKEL'S DIVERTICULUM.

Prognosis. This condition is not dangerous to life. It is, however, a source of annoyance and there is always the possibility of infection of the mucous surface. There is little probability of recovery without an operation.

Treatment. The only rational treatment, when the protrusion is as marked as in this instance, is the removal of Meckel's diverticulum at its origin from the intestine and extirpation of the navel.

CASE 17. John B. was the first child of healthy parents, except that his mother had always been anemic. There had been no miscarriages. His father denied syphilis and showed no signs of having had it. There had never been any " bleeders " in either family. He was delivered at 6 A.M., August 4, at full term, by low forceps, after a short labor, and weighed nine pounds. He was normal except for a slight abrasion on the right cheek and another on the back of the neck, and breathed at once. He was put to the breast that afternoon, took hold well, but got nothing. The next morning he was ordered one-half ounce of a mixture containing 1% of fat, 5% of sugar, 0.25% of whey proteids and 0.25% of casein every two hours, but as this was vomited it was stopped after three feedings. Since then he had had only boiled water. Oozing of blood began about midnight, August 5, from both abrasions, and a hematoma, the size of half a walnut, appeared at the site of each of them. The oozing continued and he lost about half an ounce of blood during the night. The bleeding was then controlled by pads soaked in a 1-10,000 solution of adrenalin chloride. Several small hemorrhagic areas appeared in the roof of the mouth and one, the size of a dime, on the back that morning, August 6. He had not vomited blood or had any blood in his movements. The highest rectal temperature was 99° F. He had been given 10 ccm. of fresh rabbit's serum at 3.30 P.M., August 6. He was seen in consultation at 5 P.M.

Physical Examination. He was well developed and nourished, but moderately pale. The respiration was a little rapid. He seemed uncomfortable and was inclined to moan. The fontanelle was level. There was no rigidity of the neck. There were slight ecchymoses in the right eyelids. There were several ecchymotic areas, varying in size from that of a split pea to that of a twenty-five cent piece, on the upper part of the right cheek. There was an abrasion, about 2 cm. long and 1 cm. wide, over the largest ecchymosis, where there was also some swelling. It was scabbed over and not oozing. There was an ecchymotic area, the size of a twenty-five cent piece, on the back of the left neck, where there was also a scab, but no oozing. There was an ecchymotic area, the size

of a ten-cent piece, on the lower back, and half a dozen ecchymotic areas, the size of a pinhead or a little larger, in the roof of the mouth. The heart and lungs were normal. The abdomen was negative. There was no bleeding from the stump of the cord. The liver was palpable 3 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal; there was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. There was no bleeding from the point where the rabbit's serum was injected.

The movements which were seen were loose, dark-green and contained considerable mucus, but no blood.

Diagnosis. The diseases to be considered here are congenital syphilis, hemophilia and hemorrhagic disease of the newborn. Syphilis can be excluded on the negative family history, the absence of miscarriages, the good general condition, the absence of all signs of syphilis, such as enlargement of the liver and spleen and eruptions, and the fact that hemorrhage occurs only in the severest cases which show many other signs of the disease. Hemophilia can be excluded on the family history and the fact that the tendency to bleed in hemophilia almost never appears before the end of the first year. Larrabee, writing in 1906, was able to collect but thirty-six cases of hemorrhage in the newborn due to hemophilia, and in all but two of these there was a family history of the disease. The diagnosis is, therefore, HEMORRHAGIC DISEASE OF THE NEW-BORN.

Prognosis. The condition is, in general, a very serious one. Sixty per cent, or more, of the patients die, one half of them in the first twenty-four hours after the onset of the bleeding. If they survive a week they almost invariably recover. The symptoms cease in the first five days in two thirds of the cases that recover. The cases in which there is hemorrhage from the gastro-intestinal tract and in which there is a high temperature are more serious than those in which there is no gastro-intestinal hemorrhage and in which the temperature is low.

The following prognosis seems justified in this instance.

The baby has a very serious disease. It is impossible to say whether or not the hemorrhages will recur or others appear. The outlook is, however, fairly good because he has already lived seventeen hours, there has been no hemorrhage for several hours, the bleeding is all external where it can be reached, and the temperature is normal. Every day that he lives increases his chances materially. There is no reason to fear recurrence in after years because this is a self-limited condition and not the disease hemophilia.

Treatment. It is very difficult to know just how to treat the condition known as hemorrhagic disease of the newborn, because it is probably not a definite disease, but merely a combination of symptoms due to a variety of causes, the most common of which is presumably sepsis. The only definite point in the pathology is that the blood coagulates very slowly, or not at all. It is very probable, too, that the delay in the coagulation is due to the lack of something in the blood and not to the presence of some inhibitory substance.

Most of the methods employed in the past in the treatment of this disease have recently been proved to be useless. Ergot and iron cannot, of course, have any effect in increasing the coagulability of the blood. Adrenalin has practically no action unless given intravenously. Its action is then general and not local, and the increase of the blood pressure would tend to increase rather than to diminish the bleeding. Gelatine does not increase the coagulability of the blood either *in vitro* or *in viro*. There is no lack of calcium salts in the blood in these cases and, therefore, the administration of calcium salts can do no good.

A more rational treatment is the subcutaneous injection of fresh animal serum, preferably rabbit's, which contains all the ferments of the blood. Theoretically it would seem as if this could not do any good, because the blood contains antiferment enough to much more than neutralize the ferment contained in the ordinary doses of serum before it can be utilized in coagulation. Practically, it has seemed very useful in a considerable number of cases.

The most rational method of treatment is transfusion, which not only replaces the lost blood but stops the hemor-

rhage by supplying new material for the production of the fibrin ferment. It has proved most satisfactory in the few cases in which it has been used. Before performing transfusion, however, it is necessary to be sure that the donor's blood does not produce hemolysis. Transfusion is a serious operation for both parties, and should not be undertaken lightly but only as a last resort. It must not on this account, however, be delayed too long.

This baby has already had an injection of rabbit's serum. If the hemorrhage recurs, it should be repeated in six or eight hours and again at the same interval, if necessary. If the serum fails to restrain the hemorrhage in these doses, or if at any time the baby's condition is becoming at all critical, transfusion should be done. The preferable donor is the father.

Locally, the adrenalin solution should be continued in connection with pressure. If this fails to stop the bleeding, the strength of the solution may be increased to 1-1,000, or the dry powder used. If this is not effective, Monsel's salt and pressure may be tried.

The baby should be given one to two teaspoonfuls of a mixture of one part of breast milk to three parts of water, or whey, every hour.

CASE 18. Joanne W. was the second child of healthy parents. The other child, a boy, was well. Her father had never shown any symptoms of hemophilia, except that on one occasion, when he had had several teeth extracted, the gums oozed for three or four hours. Two of his brothers had, however, died within the first two or three days of life from hemorrhages of some sort, and the first child of his sister, a girl, had died of hemorrhages when two days old. Joanne was born at noon, December 16, after a normal labor, seemed normal at birth and weighed nine and one-quarter pounds. She had three movements, consisting of meconium, in the first thirty-six hours after birth and passed urine freely. She took the breast well during the night of December 18. At 7.30 A.M., December 19, she vomited about half a teaspoonful of bright blood, and at 9.30 A.M. a little more than half a teaspoonful of bright blood. At 11.20 A.M. she had a movement from the bowels which soaked through three napkins, her nightgown and on to the bed. This movement was mostly black, but contained a little bright blood and a few clots. At 12.30 P.M. she vomited a little more blood and again at 1.30 P.M. She was given 15 cc. of rabbit's serum subcutaneously at 3 P.M. At 3.45 P.M. she had a discharge of dark blood from the bowels, which wet through two napkins. She was given 15 cc. of rabbit's serum subcutaneously at 4.15 P.M., and during the afternoon and early evening took three ounces of a thin gelatin solution by mouth. At 9.15 P.M. she had a movement from the bowels, consisting mostly of bright blood, which wet through several diapers and her nightgown. She had not seemed affected by the loss of blood before this last movement. Since then, however, she had begun to look pinched and a little blanched, and her pulse had gone up to 160. Her cry remained strong, however, and there was no sighing or restlessness. She was seen in consultation at 10.45 P.M.

Physical Examination. She was well developed and nourished, but had evidently lost weight. She looked pinched about the mouth and was a little pale. Her cry was strong. The anterior fontanelle was level. There was no rigidity of the neck. The mouth and throat showed no bleeding point.

The heart was normal. The lungs were normal in front. The back was not examined. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The stump of the cord was healthy. The rectal temperature was 99.5° F.; the pulse, 156. The extremities were not examined. She had another movement, consisting of about two tablespoonfuls of dark blood, during the examination.

Diagnosis. Hemorrhage from congenital syphilis can be excluded on the good family history, the good general condition and the absence of all other evidences of syphilis. Hemorrhage from general sepsis can be excluded on the practically normal temperature, the good general condition and the absence of jaundice, cyanosis and other signs of sepsis. The two conditions which must be seriously considered are hemophilia and hemorrhagic disease of the new-born. The history of the death of a child of an aunt and of two of the father's brothers from hemorrhage during the first few days of life and of the somewhat prolonged bleeding from the gums in the father suggests hemophilia. The bleeding from the gums in the case of the father was comparatively slight, however, and had never been considered unusual until this baby began to have hemorrhages. There are only thirty-six cases on record of hemophilia in which the symptoms appeared in the first few days of life. It seems far more probable, therefore, that the father's brothers and his niece died of hemorrhagic disease of the new-born than of hemophilia. The fact that hemophilia almost never occurs in the female makes it still more probable that the girl died of hemorrhagic disease of the new-born. Further points against hemophilia in this instance are that the disease is transmitted through the female, not through the male, and that the baby is a girl, not a boy. The hemorrhages in hemophilia seldom occur, moreover, spontaneously, while the hemorrhages in hemorrhagic disease of the new-born are almost invariably, as in this instance, spontaneous. The diagnosis of HEMORRHAGIC DISEASE OF THE NEW-BORN seems, therefore, justified.

Prognosis. There is no medicinal treatment which offers any prospect of relief. Rabbit's serum has not been of any

benefit. The chances of the spontaneous cessation of the hemorrhage are practically *nil*. She will almost certainly die within the next thirty-six hours unless a transfusion is done.

Treatment. The treatment is immediate transfusion. The most available donor is the father, since it is hardly wise to subject the mother to a long and serious operation and inadvisable to call on anyone else, because of the danger of hemolysis. The points already detailed in discussing the diagnosis seem sufficient to prove that he is not a hemophiliac and that it is safe to use his blood. (See Case 17.)

CASE 19. William S. was the first child of healthy parents. He was born September 7. His father denied having had syphilis and there was no reason to suspect that his mother had had it. There had been no miscarriages. He was delivered at full term by high forceps, was normal at birth and weighed seven and three-quarters pounds. His mother had plenty of milk. He nursed well until September 11, after which he took the breast very poorly. He did not vomit. The stools consisted of meconium during the first three days, since when he had had three or four brownish-yellow stools, containing many small soft curds and a little mucus, daily. The cord came off September 13, leaving a healthy navel. His temperature rose to 103° F. on September 10, and had ranged between 102° F. and 103.5° F. ever since. His mouth became sore September 12, and he had been more or less rigid since then. He had had no convulsions. He had lost weight and strength very rapidly during the last few days. He was seen in consultation September 15, when eight days old.

Physical Examination. He was considerably emaciated and his face looked pinched. The anterior fontanelle was sunken and the bones of the skull overlapped. The pupils were equal and reacted to light. The tongue, lips and mouth were much reddened and in places covered by a thin pseudo-membrane. The heart, lungs and abdomen were normal. The navel was healthy. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The genitals were normal. The extremities were normal. There was moderate rigidity of the neck and extremities, with slight retraction of the head. There was no rigidity of the lower jaw. The knee-jerks were equal and exaggerated. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The tips of the ears, the end of the penis and the heels and elbows were excoriated. There was also a profuse pustular eruption on the neck, as well as an occasional pustule on the body. The skin about the anus was normal. The rectal temperature was 103.2° F.; the pulse, 180; the respiration, 48.

Cultures from the throat showed the staphylococcus aureus as the predominating organism and no Klebs-Lœffler bacilli.

Diagnosis. The diagnosis in this instance lies between congenital syphilis and septic infection of the new-born. Tetanus, which is suggested by the general rigidity, can be excluded on the normal condition of the navel, and on the absence of rigidity of the jaw and of convulsions. Cerebral hemorrhage, as the result of injury at birth, and meningitis are also suggested by the rigidity. The former can be ruled out on the persistent high temperature, the sunken fontanelle, the late development of the rigidity and the local evidences of septic infection, while the sunken fontanelle and the evidences of local infection make the latter most improbable. Rigidity of the neck and extremities is, moreover, a very common symptom in the new-born whenever they are seriously ill, no matter what the trouble, and is presumably merely an exaggeration of the normal congenital muscular hypertonia. It is of no assistance, therefore, in the diagnosis between congenital syphilis and septic infection. The sore mouth and the skin lesions suggest syphilis. The lesions of the mouth and skin are, however, in no way characteristic of syphilis. There are no mucous patches about the anus and the palms and soles are clear. The family history is good, there have been no miscarriages, the baby was born at full term, there is no enlargement of the liver and spleen, the genitals are normal and the temperature is higher than would be expected in syphilis. It seems justifiable, therefore, to exclude syphilis as the cause of the illness. There is nothing about the history and physical examination which is inconsistent with a septic infection; in fact, they are both most characteristic of it. A positive diagnosis of SEPTIC INFECTION OF THE NEW-BORN is, therefore, justified.

Prognosis. The prognosis is practically hopeless. He will almost certainly die within the next forty-eight hours.

Treatment. The treatment can be only symptomatic. His mouth must be kept clean by swabbing it with a 4% solution of boracic acid or with a wash prepared with 5 parts of borax, 20 parts of glycerin and 80 parts of water. He should be fed every one and one-half hours with from two to four drachms of a mixture of equal parts of his mother's milk and water, given with a Breck feeder or a dropper. He

should also be given $\frac{1}{1000}$ of a grain of strychnia every three hours and, if necessary, caffeine-sodium benzoate, in doses of $\frac{1}{16}$ of a grain, in addition. A dressing of boracic acid ointment should be applied to the excoriated areas and boracic acid powder to the neck.

CASE 20. Frederick G. was the second child of healthy parents. He was born at full term, December 29, after a rapid labor at which, in the absence of both physician and nurse, the grandmother officiated. He was normal at birth and weighed seven and one-half pounds. The cord came off January 3. Reddening and thickening about the navel, accompanied by a foul, thin, glairy discharge, was noticed January 9. There had been but little change in the local condition since then, although the physician in charge had pulled a slough, an inch long and as large around as a slate pencil, from the navel, January 16. He had taken the breast well until January 15, since when he had been given small quantities of his mother's milk, diluted with water, from the bottle. He began to vomit January 18, the vomitus being green. He had had ten or twelve loose, green stools, containing small curds and mucus, daily since January 10. The rectal temperature had ranged between 102° F. and 103° F. since January 17; it had not been taken before. He had lost weight and strength very rapidly during the last forty-eight hours. He was seen in consultation January 19.

Physical Examination. He was considerably emaciated. The skin was pale with a decided yellow tinge. He looked and acted very sick. The anterior fontanelle was depressed and the bones of the skull overlapped. The tongue was considerably coated and the whole mouth reddened. The heart and lungs were normal. There was a round and tender swelling, about the size of one-half of an English walnut, about the navel. There was an opening, the size of a slate pencil, in the centre, from which a foul, glairy material could be squeezed. A probe could be run about, parallel with the surface, for an inch in all directions, but no opening into the deeper tissues or abdomen could be found. The abdomen showed nothing else abnormal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal and there was no enlargement of the peripheral lymph nodes. The rectal temperature was 102.6° F.; the pulse, 180; the respiration, 48.

Diagnosis. The diagnosis of OMPHALITIS and SEPTIC INFECTION OF THE NEW-BORN is plain. There is no evidence of a direct extension of the inflammatory process into the abdomen or along the vessels to the liver. The infection must be, therefore, a general one.

Prognosis. The outlook is practically hopeless. There is not one chance in one hundred of recovery. He will probably not live more than two or three days.

Treatment. The inflammatory area at the navel should be opened up, cleaned out and dressed with a $\frac{1}{5000}$ solution of corrosive sublimate. He should be given one-half an ounce of a mixture of two parts of his mother's milk, one part of lime water and one part of water every one and one-half hours. He should also be given $\frac{1}{1000}$ of a grain of strychnia every three hours. This may be helped out from time to time, if necessary, by caffeine-sodium benzoate, in doses of one-sixteenth of a grain, given subcutaneously.

CASE 21. Baby G. was born at full term after a normal labor. He seemed healthy at birth but was not carefully examined. He was taken care of by a woman ignorant of the ordinary rules of cleanliness. The cord came off on the seventh day. The navel was healthy and at no time, before or after, was there any redness or inflammation about it. He was breast-fed and did very well until he was five days old, when he began to vomit a little and act as if he had pain in the abdomen. The vomiting and pain continued and increased in severity. He also began to have two or three loose yellow movements, containing fine curds and having a foul odor, daily. When he was nine days old a swelling, which seemed tender, was noticed in the epigastrium. The swelling in the epigastrium increased and by the twelfth day the whole abdomen was distended. He had apparently begun to have fever on the eighth day, but the temperature had not been taken. He was seen in consultation when two weeks old.

Physical Examination. He had evidently lost much weight and his color was pasty. His face bore an expression of suffering. The fontanelle was depressed. There was no rigidity of the neck. The pupils were equal and reacted to light. The tongue was dry and covered with a brownish coat. The heart and lungs were normal. The upper border of the liver flatness in the nipple line was at the fourth rib; the lower border was not palpable. The spleen was not palpable. The navel was healthy and there was no redness about it. The abdomen was generally considerably distended, but distinctly more so in the epigastrium. It was everywhere tympanitic, except over an area, the size of a silver dollar, in the median line midway between the tip of the ensiform and the navel. There was a marked sense of resistance in and about this area, but no definite muscular spasm. Tenderness was general throughout the abdomen, but much more marked over the resistant area in the epigastrium. There was no dullness in the flanks and no fluid wave. The legs were drawn up on the abdomen and extension caused additional pain. It was impossible to determine the presence or absence of the knee-jerks or Kernig's sign

because of the baby's resistance. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 104° F., the pulse 160, the respiration 60.

Diagnosis. The trouble is undoubtedly located in the abdomen. The liver is displaced upward. The fact that the baby is breast-fed and the mildness of the symptoms of indigestion in comparison with the high temperature, poor general condition and marked local symptoms show that the trouble is outside the gastro-intestinal tract. The situation of the local symptoms and the age of the baby make appendicitis very improbable. The two possibilities are an inflammatory process, probably a localized abscess in the epigastrium, or a general peritonitis. The localization of the physical signs in the epigastrium and the absence of general muscular spasm and free fluid in the abdomen are much against general peritonitis and in favor of a localized abscess. A white count was not made because it could not help in the diagnosis, since both conditions are associated with leucocytosis. An inflammatory process in the upper or middle abdomen at this age is almost invariably due to infection through the navel. The navel in this instance shows no signs of inflammation at present, and has shown none in the past. This does not rule out infection through the navel, however, as it is not uncommon for this to occur without causing any local manifestations. The known ignorance and the uncleanliness of the woman who took care of the baby make an infection through the navel seem even more likely. The most reasonable diagnosis is, therefore, a localized inflammatory process, probably an abscess, in the epigastrium, as the result of an infection through the navel, i. e., a SEPTIC INFECTION OF THE NEW-BORN.

Prognosis. The prognosis is hopeless without an operation, practically hopeless with one.

Treatment. The only treatment which offers any chance of recovery is an immediate laparotomy.

CASE 22. Constance H. was born January 5 at full term, after a normal labor, and was normal at birth. Her mother had an uneventful convalescence, without any signs of sepsis, and had a plentiful supply of milk. There had been no irritation of the nipples or inflammation of the breasts. She did perfectly well until January 24, when she did not take the breast well, but did not seem sick in other ways. She was seen by her physician the next morning. He found nothing abnormal on physical examination, but a rectal temperature of 102° F. She took the breast well again during that day. The next morning, the twenty-sixth, her upper lip was considerably swollen and reddened. The swelling extended to the lower lip during the day, and during the night to the right cheek. The whole of the right cheek was involved on the twenty-eighth, but the swelling of the lips had diminished so much that she was able to nurse again without difficulty. The swelling extended during the twenty-ninth to the right ear and side of the head. The rectal temperature had ranged between 102.5° F. and 104.5° F. She had not vomited and had had normal movements. She was seen in consultation at 5 P.M., January 29.

Physical Examination. She was well developed and nourished and of good color. Her cry was strong. The anterior fontanelle was level. There was no rigidity of the neck. The pupils were equal and reacted to light. There was no nasal discharge. The mouth was healthy. Both the upper and lower lips were slightly swollen, but not reddened. The whole of the right side of the face was somewhat swollen and slightly reddened. The right ear was much swollen and reddened, as was also the lower part of the right side of the head. The edge of the swelling about the ear and side of the head was raised and easily distinguishable by its induration and color from the surrounding tissues. The swelling was not especially tender. The heart, lungs and abdomen were normal. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The navel was healthy. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no en-

largement of the peripheral lymph nodes. The rectal temperature was 104.5° F.; the pulse, 160; the respiration, 36.

Diagnosis. The progressive extension of the swelling, the improvement in the parts first affected and the elevated and sharply defined edge are so characteristic of ERYSIPELAS, that there can be no doubt that this is the diagnosis.

Prognosis. At least 90% of young babies affected with erysipelas die, erysipelas at this age being almost invariably migratory in character. Babies that survive the acute stage of the disease are, moreover, very likely to die, apparently from weakness, within the next one or two weeks. The chances are, therefore, very much against recovery in this instance, in spite of the baby's good general condition at present.

Treatment. There is no local treatment which has much, if any, effect on the progress of the disease. Ichthyol has as much, if not more action than any of the others. A 30% ointment of ichthyol, prepared with vaseline, should be applied every three or four hours to the affected areas. There is no drug which has any effect whatever on the local condition. In the more chronic cases vaccines sometimes seem to be of assistance. If the process continues to extend in this instance, it will perhaps be advisable to use vaccines after another week. The most important methods of treatment are regulation of the diet and hygienic surroundings. The baby is now on the breast. This food cannot be improved upon. Great care must be taken, however, to prevent infection of the mother's nipples and breasts. She should be given all the fresh air and sunlight possible. No stimulation is required at present.

SECTION III.

DISEASES OF THE GASTRO-ENTERIC TRACT.

THE classification which follows is a slight modification of that adopted by the Department of Pediatrics of the Harvard Medical School, and, while open to many objections, seems to the author more satisfactory than any other. It is given in order that the terms used later may be intelligible.

The author is in the habit of roughly dividing the diseases of the gastro-enteric tract, associated with diarrhea, in the following manner. He realizes that this division is arbitrary and open to much criticism, but it seems to him reasonably satisfactory from a clinical standpoint and as a basis for treatment.

When there is merely an increase in the number of movements, with a diminution in the consistency, no fever and practically no other symptoms, he describes the condition as nervous diarrhea and attributes it to causes acting directly or indirectly on the central nervous system.

Under normal conditions there is an equilibrium between the work to be done and the power to do it, that is, between the food which is to be digested by the intestinal secretions and the secretions. If there is a disturbance of this equilibrium, either from an increase in the amount of work to be done, as occurs when the amount or strength of the food is too great, or from a diminution in the amount or digestive power of the secretions, as occurs when the child is depressed from any cause or is suffering from some other disease, the condition designated as intestinal indigestion due to disturbance of equilibrium develops. This condition may be either acute or chronic. Bacteria play no part in its etiology. The stools are increased in number and, as a rule, diminished in consistency, but usually not changed in color. They also show evidences of incomplete digestion

of the food. Under this head are included those disturbances due to an excess of one or more elements of the food, fat, carbohydrates or proteids, as the case may be. The character of the stools in such instances naturally varies according to what element or elements of the food are in excess. The term, malnutrition resulting from an excess of fat, carbohydrates or proteids in the food, describes the condition more satisfactorily, perhaps, than does that of chronic intestinal indigestion.

If fermentation or decomposition takes place in the intestinal contents as the result of bacterial action, new symptoms develop. The stools are usually changed in color and odor and show more marked disturbance of digestion. Other symptoms, such as fever, may appear as the result of toxic absorption. This is the class of cases known as intestinal indigestion of the fermentative type. It is more often acute than chronic. It is assumed that in pure cases there is no inflammation of the intestine and no entrance of bacteria into the circulation.

If the bacteria cause inflammatory changes in the intestinal wall there is usually a further change in the character of the stools, which become very numerous and are composed mainly of mucus and blood. The temperature is usually moderately and constantly elevated, and the constitutional symptoms are much more marked. It is probable that in many instances bacteria traverse the intestinal wall and enter the circulation. This condition is called infectious diarrhea of the dysenteric type.

Cholera infantum, in which there is a very large number of profuse watery movements, is presumably a variety of infectious diarrhea.

Since the diagnosis between the various diseases of the gastro-enteric tract is of relatively more importance than that between these and other diseases, the cases illustrative of them are given together and follow.

GASTRIC.

- Developmental
  - Malpositions.
  - Malformations — Pyloric stenosis.
- Non-Infectious
  - Functional.
    - Nervous vomiting.
    - Recurrent vomiting.
    - Indigestion { Acute. / Chronic.
  - Mechanical.
    - Contraction.
    - Dilatation.
  - Ulcers — peptic.
  - New growths.
  - Gastritis — corrosive.
- Infectious
  - Gastritis.

ENTERIC.

- Developmental
  - Malpositions.
  - Malformations.
- Non-Infectious
  - Mechanical.
    - Dilatation of colon.
    - Volvulus.
    - Intussusception.
    - Hernia.
    - Fissure.
    - Prolapse.
    - Polypi.
    - Hemorrhoids.
  - New growths.
  - Functional.
    - Incontinence.
    - Constipation { Atonic. / Spasmodic. / Mechanical.
    - Nervous diarrhea.
    - Indigestion
      - Duodenal { Acute. / Chronic.
      - Intestinal { Disturbance of equilibrium { Acute. / Chronic. / Fermentation.
- Infectious
  - Proctitis.
  - Appendicitis.
  - Fistulæ.
  - Infectious diarrhea { Dysenteric type. / Cholera infantum.

ANIMAL PARASITES.

CASE 23. Frank G., six years old, was the second child of markedly neurotic parents. His brother, who was nine years old, would not eat meat, milk or eggs. He was well up to the age of two years when he had the whooping-cough, in which he had frequent attacks of vomiting. Since then he had had recurrent attacks of vomiting, lasting for weeks at a time. At the beginning of an attack he would vomit solid food, but would retain liquids. After a few days he would vomit liquids and finally would retain nothing. He would then gradually improve and get back to his usual routine. He would never, however, even between attacks, swallow hard solids, like meat, but swallowed bread, after chewing it thoroughly, and soft solids without difficulty. The vomiting always occurred immediately after taking food. If the food was not vomited within a few minutes after it was taken, it was retained. He never vomited any food which had been taken some time before or which was decomposed. He never had any pain. The bowels were constipated during the attacks, but at other times the movements were normal. He had been through a course of stomach washing six months before he was seen in consultation. An adult stomach tube was passed at that time without difficulty. There was no evidence of gastric stasis and the stomach contents showed no evidences of indigestion. His present attack was the most severe that he had ever had. He had retained practically nothing for a number of days, although he had been very hungry and had taken food eagerly. Even water had been vomited immediately during the last few days. Thirst was consequently extremely troublesome. He had been given nutrient enemata for several days, but had, nevertheless, lost rapidly in flesh and strength.

Physical Examination. He was thin and pale. He was perfectly clear mentally. He was constantly asking for water. He would take about two ounces eagerly, but would vomit it up immediately with considerable retching. He would at once take another two ounces and vomit it up and would apparently have kept on doing this indefinitely. His tongue was clean. The throat was normal to both inspection and palpation. When water was swallowed gurgling could be

heard to the left of the spinous processes as far down as the sixth dorsal spine (normally it should be heard to the eighth or ninth). Nothing could be heard entering the stomach. An adult-sized stomach-tube was easily passed in seven inches from the incisor teeth, where it met an obstruction and could be passed no further. When a very little water was poured in, it was promptly vomited and evidently did not reach the stomach. The heart and lungs were normal. There was no dullness under the manubrium or in the middle back. The bronchial voice sound was not heard below the seventh cervical spine. Air entered both lungs alike. There was no evidence of pressure on veins or nerves within the thorax. There was no murmur under the manubrium, and the pulses were synchronous in both arms. The abdomen was sunken and entirely negative. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

The urine was high-colored, strongly acid, of a specific gravity of 1030, and contained no albumin or sugar. The sediment was abundant and composed of amorphous urates.

Diagnosis. There is undoubtedly a narrowing of the esophagus about four inches above the cardia. This narrowing cannot be due to pressure from the outside, because of the duration of the symptoms and the absence of all signs of inflammation, new growth, aneurism or enlargement of the tracheobronchial lymph nodes. It cannot be due to cicatricial contraction, because there is no history of any injury in the past. The duration and the intermittence of the symptoms, as well as the relatively good general condition, rule out a malignant growth, while these points in connection with the absence of other evidences of syphilis exclude a syphilitic growth. The facts that small quantities are vomited immediately, that several feedings are never retained and then vomited and that the vomitus is never decomposed show that there is no marked dilatation above the narrowing and no diverticulæ. The narrowing may be due, then, to a non-malignant constriction, to spasm, or to a combination

of the two. The points in favor of an organic constriction are the permanent inability to swallow solid food, the firm resistance encountered by the stomach tube, the persistence of the symptoms in the present attack and the tender age of the patient. The points in favor of spasm are the neurotic family inheritance, the fact that his brother has always refused to eat certain kinds of food, the intermittence of the symptoms and the fact that a stomach-tube could be passed easily six months ago. The most reasonable explanation seems to be that he has always had a certain amount of organic constriction, that the obstruction has been exaggerated at times by spasm and that the organic constriction has now increased so much that it practically obliterates the lumen. This diagnosis ought, however, to be verified by an examination with the Roentgen ray after the ingestion of bismuth paste. The accompanying Roentgenographs show the conditions found in this way by Dr. A. W. George. The diagnosis of ORGANIC STRICTURE OF THE ESOPHAGUS is, therefore, verified.

Prognosis. The prognosis is hopeless without surgical intervention. He can, of course, be kept alive for a short time by nutrient enemata and the subcutaneous injection of salt solution. Death must, however, eventually result from starvation. If the stricture is dilated, either from above or below, the cure ought to be a permanent one and recovery complete.

Treatment. The treatment is, of course, the dilatation of the stricture by the passage of bougies. It is possible that he can be made to swallow a thread and that bougies can be passed along it. This is a difficult procedure in a child, however, and it will in all probability be necessary to do a gastrotomy and pass the first bougie from below upward.

Antero-posterior view.

Lateral view.

FRANK G. Case 23.

CASE 24. David R. was born at full term, February 16, after a normal labor. He seemed normal at birth, but was not weighed. The breast-milk came in quickly, was sufficient in quantity and he took it well. When four days old he began to vomit after nearly every feeding, the vomiting occurring immediately after nursing. He usually cried at the time of the vomiting and for ten or twenty minutes after it, as if in pain. When two weeks old, condensed milk and lime water and barley water and lime water were tried in place of the breast-milk. Both were vomited and he was, therefore, put back on the breast. The vomiting from this time on was explosive. Beginning March 13, ten drops of lime water and one teaspoonful of water were given before each nursing. The vomiting had not been quite as severe since then. The bowels had not moved spontaneously since he was a week old. Suppositories were ineffectual, but a movement had been obtained daily from castoria. These had been very small, often being merely a dark brown stain on the napkin. He had not been weighed, but was thought to have lost weight steadily since he was a week old. He was admitted to the Infants' Hospital, March 17, when a month old.

Physical Examination. He was small, emaciated and feeble, but his color was fair. The skin was not very dry, but there was a little general rigidity. The anterior fontanelle was two and one-half cm. in diameter and sunken. The posterior fontanelle was still open. The bones of the skull did not overlap. The mouth was clean and moist. The heart and lungs were normal. The liver was just palpable in the nipple line. The spleen was not palpable. The abdomen was sunken and nothing abnormal could be detected in it when the stomach was empty. He was given a bottle of whey and after he had taken an ounce the stomach was distinctly palpable. When he had taken two ounces the stomach felt hard, but there was no visible peristalsis. By the time he had taken two and one-half ounces the pylorus could be felt to contract and harden, being as large as the last joint of the little finger. This was followed by marked explosive vomiting of all that he had taken. The pylorus

could then be felt to relax and finally entirely disappear. This sequence recurred every time that the stomach was filled. There was no visible peristalsis at any time. The genitals were normal. The extremities showed nothing abnormal. There was no paralysis. The knee-jerks were equal and lively. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. He weighed four pounds.

The urine was pale in color, clear, slightly acid in reaction and contained no albumin.

The stool was composed of bile and water with a very little mucus.

Diagnosis. The slight general rigidity suggests, to a certain extent, some cerebral lesion as the cause of the vomiting. The rigidity can be equally well explained, however, by the age of the baby and the disturbance of nutrition, both of which are often accompanied by muscular hypertonia. The positive findings in the abdomen prove, moreover, that the condition is a local one. Chronic gastric indigestion is very uncommon in breast-fed babies. It can be excluded in this instance by the explosive vomiting, the pain during and after vomiting, the lack of milk remains in the movements, and the presence of a palpable tumor at the pylorus. The diagnosis lies, therefore, between spasm of the pylorus and stenosis of the pylorus.

The fact that the baby is breast-fed is a point in favor of stenosis, while the pain during and after vomiting is in favor of spasm. The explosive vomiting, the constipation and the progressive failure are symptoms common to both conditions and are, therefore, of no importance in differential diagnosis. The presence of a tumor points strongly towards stenosis, because a tumor is much more often palpable in stenosis than in spasm. The intermittent contraction and relaxation of the tumor never occurs in stenosis, however, and is most characteristic of spasm. The presence of this sign justifies, therefore, a positive diagnosis of SPASM OF THE PYLORUS.

Prognosis. His general condition is fair under the circumstances; the disease is curable; he has had no rational treatment. The outlook is, therefore, reasonably good.

Treatment. He should be taken off the breast for the present. The breasts must not be allowed to dry up, however, for he will probably be able to take breast-milk again later. The most suitable food for him at present is one which has but little stimulant action on the gastric secretions and which will leave the stomach quickly in the liquid form. Whey is such a food. The stomach becomes palpable and hard from contraction when he has taken but an ounce. He ought not, therefore, to be given more than half an ounce at a time. If given such a small amount at a feeding, he must be fed at short intervals. Otherwise he will not get enough food. He should, therefore, be given sixteen feedings, at one and one-half hour intervals, of one-half an ounce of whey. It has been claimed, and there is some evidence to show that it is true, that rectal injections of salt solution diminish the gastric secretions and hence gastric spasm. It will be well, therefore, to give an ounce of physiological salt solution with a rectal tube every four hours. If it does not have this action, it will, at any rate, supply needed water to the tissues.

If the whey is retained, as it probably will be, the amount can be increased to 20 or 25 cc. at a feeding. The caloric value of this food is, however, entirely insufficient to cover his needs and must soon be increased. The following principles must be remembered in strengthening his food: fat delays the emptying of the stomach; carbohydrates leave the stomach quickly; casein is coagulated by rennin, while whey proteids are not; alkalies delay the action of rennin and allow the passage of the milk into the intestine before it is coagulated. A suitable modification for him will be, therefore, one containing 1% of fat, 7% of milk sugar, 0.75% of whey proteids and 0.25% of casein, with lime water 50% of the milk and cream in the mixture. If this is well borne he may then be given a mixture containing 1.50% of fat, 7% of milk sugar, 0.75% of whey proteid and 0.25% of casein, with lime water 50% of the milk and cream or, better, equal parts of breast-milk and a 7% solution of milk sugar.

CASE 25. Robert M., the second child of healthy parents, was born at full term after a normal labor. He was normal at birth and weighed six pounds and twelve ounces. His mother had a plentiful supply of milk and he was nursed regularly at two-hour intervals. He vomited a little from the first, but when two weeks old began to vomit much more. This was at first attributed to indiscretions in diet on his mother's part, but continued to increase after her diet was carefully regulated. It was then thought that he got too much milk, and the length of nursing was shortened to five minutes. This made no difference in the vomiting. A half-teaspoonful of lime water was then given with each nursing, but did not affect the vomiting. The mother was a healthy, vigorous woman, and it did not seem probable that the composition of the breast-milk was at fault, although it had not been examined. Whey, which was tried for twenty-four hours, was vomited more than the breast-milk. The vomiting sometimes occurred immediately after nursing, but usually not for an hour or more. Sometimes several feedings were retained and then vomited together. The vomiting had recently been explosive. The bowels had moved regularly, but the movements had been small; they were dark green in color and composed largely of mucus with a few fine curds. He acted hungry all the time and cried a great deal, apparently from hunger. He gained slowly in weight during the first three weeks up to seven pounds and twelve ounces. When seen in consultation, when five weeks old, he had dropped back to seven pounds and four ounces.

Physical Examination. He was well developed and nourished and of good color. The fontanelle was level, and the bones of the skull did not overlap. His tongue was clean and moist. The heart and lungs were normal. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The examination of the abdomen was at first rather difficult because of the crying, and nothing abnormal was detected. The stomach was undoubtedly empty, as he

had vomited a great deal about an hour before and had taken nothing since. It was thought that he would keep quieter if his stomach was filled and that perhaps something might be seen or felt then which could not be before. He was, therefore, given two and one-half ounces of water, which he took greedily. The lower border of the stomach then reached to the navel, and very marked waves of peristalsis, running from left to right, appeared. A mass about the size of a marble was felt indistinctly in the region of the pylorus. He then vomited the whole of the water in one gush, the water striking the floor about three feet from the baby. The tumor could then be felt very distinctly while the baby was relaxed after the vomiting. He had a small movement, consisting of about half a teaspoonful of brownish mucus, during the examination.

Diagnosis. The history in this instance is so typical of Infantile Pyloric Stenosis that it justifies, as far as any history without physical examination can, a positive diagnosis of this condition. The only other disease to be seriously considered is chronic gastric indigestion. The appearance of vomiting in a breast-fed baby after two weeks, in which there had been only a little spitting up, the progressive increase of the vomiting, the failure to respond to regulation of the nursing, the explosive character of the vomiting and the small meconium-like stools containing almost no fecal residue, are not consistent with chronic gastric indigestion. A cerebral lesion as the cause of the vomiting can be immediately ruled out on the general condition, the level fontanelle and the absence of spasm, paralysis and increased reflexes.

The physical examination verifies, of course, the diagnosis made on the history. The enlargement of the stomach, the visible peristalsis and the palpable tumor are proof positive. The methods employed in the examination of the abdomen are worthy of attention. No examination of the abdomen can be considered complete, when there is a suspicion of stenosis of the pylorus, unless it is made with the stomach both full and empty. If peristalsis is not visible when the stomach is full, it can often be produced by stroking the epigastrium or flicking it with a towel wet in cold water, or a piece of ice. The author believes that a positive diagnosis of

pyloric stenosis would have been justified in this case even if a tumor had not been felt.

Prognosis. The prognosis without operation is hopeless; with an operation by a competent surgeon the outlook is very good, because of the baby's good general condition. The operations for this condition are all so recent that there are almost no data as to what happens to these babies in after years. What data there are, however, go to show that their digestive powers are not impaired, that they develop normally and that their expectation of life is not altered.

Treatment. The only rational treatment in this instance is immediate operation. The best operation is a posterior gastro-enterostomy. It is a delicate operation, requiring special skill. Slight variations in technic make the difference between success and failure, life and death. No surgeon who has not done it before, or who has not had much experience in operating on small animals, should attempt it.

CASE 26. Mary M., three and a half years old, was in the habit of having occasional attacks of vomiting, which were usually of short duration. She was a well and vigorous but nervous child. She was carefully fed. July 1 she ate an unusually hearty supper of proper food at six o'clock and then played very hard and was a good deal excited for about half an hour. She went to bed soon after and quickly dropped to sleep. She woke up and began to vomit at 9 P.M. The vomiting continued and finally there was much retching without vomiting. The vomitus at first consisted of the food taken at supper, later of nothing but mucus. She was seen at 11.30 P.M.

Physical Examination. She was well developed and nourished and did not look or act ill. Her tongue was nearly clean. The level of the abdomen was that of the thorax. There was no muscular spasm or tenderness. The rest of a careful physical examination showed nothing abnormal. The rectal temperature was 98.6° F.

Diagnosis. The absence of physical signs and the normal temperature rule out at once all diseases outside of the digestive tract. The only diseases of this tract to be considered are nervous vomiting, acute gastric indigestion and the onset of recurrent vomiting.

It is impossible to absolutely exclude recurrent vomiting at this time, only two and a half hours after the onset, but the history of similar attacks in the past, all of short duration, makes it very improbable. The differentiation between nervous vomiting and acute gastric indigestion is a rather difficult and uncertain one, as the line between the two forms is not very sharp. The absence of temperature and the practically normal condition of the tongue are against indigestion. The fact that the vomiting developed after a meal of proper food followed by undue exertion and excitement point strongly to a nervous disturbance. The over-exertion and excitement presumably inhibited digestion, and the undigested food acted like a foreign body in the stomach and brought on the vomiting by reflex action. The diagnosis is, therefore, NERVOUS VOMITING.

Prognosis. The prognosis as to life is, of course, good. The stomach having been thoroughly emptied, as shown by

the character of the last vomitus, the vomiting ought to stop in a few hours or less, if nothing is done in the way of medication to keep it up.

Treatment. Quiet and frequent sips of a solution of bicarbonate of soda, fifteen grains to a glass of water, are all that is necessary. A mild laxative, such as two teaspoonfuls of milk of magnesia, in the morning, to hurry along any undigested food which may have passed into the intestine is advisable. Broth and toast for breakfast, and a rather light diet and quiet for the rest of the next day, complete the treatment.

CASE 27. Rosamond B. was seven and a half years old. Her mother had valvular heart disease and was markedly neurotic. Her mother's family was extremely neurotic and several members had been insane. Her father's family was rheumatic.

She was a decidedly neurotic child and was very fussy about her diet, and had also been fed very carefully because of the rheumatic family history. Her appetite was very good. She had had no symptoms of indigestion except that her bowels were always constipated. She had been taking cascara regularly for more than a year.

She had had no unusual excitement, had not exerted herself unduly, and had done nothing unusual during November 28. She began to vomit at 5 A.M., November 29. She vomited every few minutes during that day and night and about every two hours during the 30th up to 9 P.M., when she was seen in consultation. In all, she vomited fifty-two times during this period. The vomiting was not explosive. The vomitus at first contained a little of the food taken at supper, but after this consisted of water mixed with a little mucus. It did not contain bile. She had taken nothing by mouth except water in small quantities and cracked ice, which had been given because of the extreme thirst. Both had been vomited immediately. The bowels had been moved freely by enemata. The stools were normal in character. Her temperature, taken in the axilla, had ranged between 99° F. and 100° F. She had been rather restless and had slept but little. Bromide, given by enema, had quieted her considerably. She had had no pain.

Physical Examination. She was tall and slight. Her color was good. The pupils were equal and reacted to both light and accommodation. There was no rigidity of the neck. She was perfectly clear mentally. Her tongue was moist and but slightly coated. Her breath had a slightly sweetish odor. The heart, lungs and liver were normal. The level of the abdomen was that of the thorax. There was no muscular spasm and no tenderness. Palpation was easy and disclosed nothing abnormal. The spleen was not palpable; the area of dullness was normal. The extremities showed nothing

abnormal. There was no spasm or paralysis. The knee-jerks were equal and lively. Kernig's and Babinski's signs were both absent. The cervical and axillary lymph nodes were somewhat enlarged; the inguinal were not. The rectal temperature was 99° F., the pulse 96, the respiration 20. She did not object to the examination, but gave the impression that she was decidedly neurotic.

The urine contained neither albumin nor sugar, but gave the tests for both acetone and diacetic acid.

Diagnosis. The conditions which may be reasonably considered in this instance are meningitis, more likely tubercular than cerebrospinal, intestinal obstruction, nervous vomiting and recurrent vomiting.

Meningitis can be at once excluded on the combination of the absence of all signs of meningeal irritation, the low temperature and the excessive amount of the vomiting compared with the other symptoms. It can be so positively excluded that lumbar puncture is not justified as a method of diagnosis, although this ought to be done in every case in which there is a reasonable chance of meningitis because of the good which can be accomplished by the serum treatment in cerebrospinal meningitis, especially when the diagnosis is made early.

Intestinal obstruction can also be excluded on the character of the vomitus, the absence of physical signs in the abdomen, the clean tongue, the free movements from the bowels, the low temperature and the good general condition.

The neurotic family history and the neurotic disposition of the patient are consistent with either nervous or recurrent vomiting. So are the character of the vomitus, the absence of physical signs, the clean tongue, the low temperature and the good general condition. The excessive amount of the vomiting and the absence of any cause for nervous vomiting make this diagnosis very improbable. In fact, the whole picture is characteristic of what is known as RECURRENT VOMITING. It may be said that it is incorrect to call the condition "recurrent vomiting" when the child has never had anything like it before. It must be remembered in this connection, however, that there is always a first time for everything. Since acid intoxication is probably one of the

causes of recurrent vomiting, the sweet odor of the breath and the presence of acetone and diacetic acid in the urine might be thought indicative of this condition as against nervous vomiting. This is not so, however, as the abstinence from food for thirty-six hours will account for them equally well.

Prognosis. There is no danger as to life. The vomiting will probably not persist more than forty-eight hours longer, more likely a shorter than a longer time. The duration will depend somewhat on whether the treatment is rational or not.

Treatment. Before taking up the treatment it must be remembered that recurrent vomiting is probably merely a symptom-complex of manifold etiology. In most instances it is a manifestation of some disturbance of metabolism. This disturbance is sometimes an intoxication from the acetone bodies (the so-called acid intoxication) and sometimes an intoxication from uric acid. Most often the nature of the disturbance is unknown. In some instances it is a manifestation of inflammation of the appendix. In this instance appendicitis can be immediately ruled out on the absence of all signs of inflammation in this region. It is impossible to state, however, what the nature of the disturbance of metabolism is. The sweet breath and the presence of acetone bodies in the urine suggest acid intoxication. They do not prove it, however, because starvation will also account for them. It is reasonable, however, to treat the condition on this basis. Such treatment can do no harm if it does no good.

This treatment consists in the administration of bicarbonate of soda. From one-half ounce to an ounce should be given in twenty-four hours. The attempt should be made to give it by mouth in teaspoonful or tablespoonful doses of a solution of bicarbonate of soda, one teaspoonful to a glass of water, every fifteen to thirty minutes. It is well to persist, even if the soda is vomited. High enemata of a solution of bicarbonate of soda, two drams to six ounces of water, should be given every four hours. The child should be kept perfectly quiet, in a cool, dark room. No food should be given by mouth. It will probably be necessary on account of the excessive thirst to give small amounts of liquid, even if vom-

ited. Water or carbonated water, in doses of from one teaspoonful to one tablespoonful, or cracked ice, may be given. If she is restless or sleepless from vomiting, ten or fifteen grains of bromide of soda may be given in the enemata of bicarbonate of soda. If this is not effective, morphia, gr. $\frac{1}{16}$, may be given subcutaneously. Food should not be given until twelve hours after the vomiting has stopped. Whey, cereal waters, or cereal waters with sugar, should then be given, beginning with an ounce every hour and increasing the amount if they are retained. These foods are given instead of broths or albumin water because the carbohydrates antagonize the acid intoxication and have more food value.

CASE 28. Ralph C., two years old, had always been well except for an occasional attack of acute gastric or intestinal indigestion. He had had nothing unusual for supper, but had eaten a good deal hurriedly and had been a good deal excited after supper. He began to vomit and to be feverish about midnight. The vomitus consisted first of his supper and then of water and mucus. He had apparently had no pain, and had been clear mentally. The bowels had not moved. He had no cough. He was seen at 5 A.M.

Physical Examination. He was well developed and nourished, but a little pale. He vomited twice during the examination. He was perfectly clear mentally. There was no motion of the alæ nasi and the respiration was quiet. There was no rigidity of the neck. The pupils were equal and reacted to light. The tongue was moist, moderately coated and not reddened. The throat was normal. The heart and lungs were normal. The abdomen was a little sunken and lax. There was no tenderness, muscular spasm, tumor or dullness. The liver was just palpable, the spleen was not. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal; Kernig's sign and the neck sign were absent. There was no rash. The membranæ tympanorum were normal. The rectal temperature was 103.5° F., the pulse 130, the respiration 30.

Diagnosis. The sudden appearance of vomiting and fever is consistent at this age with the onset of almost any acute disease, and it is often impossible as early as this to make a positive diagnosis. Certain diseases are more probable, however, than others. These are, in the first place, acute gastric indigestion, pneumonia and scarlet fever; in the second place, tonsillitis, influenza, otitis media and meningitis, especially of the cerebrospinal form.

The normal ear drums rule out otitis media; the absence of reddening of the throat and enlargement of the tonsils, tonsillitis. Meningitis, beginning with such acute symptoms as in this instance, would almost certainly have shown by this time some signs of meningeal irritation, none of which are present. The relatively slow rate of the respiration in comparison with the pulse practically rules out pneumonia.

The absence of cough, of motion of the alæ nasi and of physical signs in the lungs, together with the quiet respiration, are also against it, but not nearly as important as the relatively low rate of the respiration. The absence of inflammation of the throat and enlargement of the papillæ of the tongue is against scarlet fever, but does not rule it out, as they might not have developed at this time. The rash would not, of course, have appeared thus early. Scarlet fever is, therefore, a possibility. Influenza is always a possibility with this history, as its manifestations are so manifold. The abdominal type is, however, much less common at this age than the respiratory type. The history of attacks of acute gastric indigestion in the past, the hurried and hearty supper with the subsequent excitement, the absence of the signs characteristic of other diseases and the fact that acute gastric indigestion is very common while the other conditions to be considered are relatively rare, make the diagnosis of acute gastric indigestion altogether the most probable. The final diagnosis is, therefore, ACUTE GASTRIC INDIGESTION, with the bare possibility that it may be scarlet fever or influenza. Twenty-four, or at most forty-eight hours, will settle the diagnosis positively, either by the cessation of the symptoms or the development of something more definite.

Prognosis. The prognosis as to life is, of course, absolutely good. The vomiting will probably cease during the day. He will, however, probably have more attacks unless his diet and routine are very carefully regulated.

Treatment. The treatment should be on the basis of the diagnosis of acute gastric indigestion. It will do no harm if the true diagnosis proves to be scarlet fever or influenza. The first thing to do is to cleanse the stomach. The quickest and most effective way to do this is to wash out the stomach. This is a very simple operation in a child of this age. A soft rubber catheter, No. 16 American, is used. It should be passed through the mouth and the stomach washed with plain water, or a weak solution of bicarbonate of soda, until the wash water returns clear. The stomach may also be cleansed, but less quickly and effectually, by giving copious drinks of water which will probably be immediately vomited.

Food should be entirely withheld for from eight to twelve hours. Whey or broth, in one or two-ounce doses, every one or two hours, may then be given. A solution of bicarbonate of soda, one-half teaspoonful to a glass of water, given in teaspoonful doses every fifteen to thirty minutes, will probably help to quiet the stomach.

After the stomach has been cleansed and rested for an hour or two, a dessertspoonful of castor oil should be given. This may be vomited, but will probably be retained. If it is vomited, one-half teaspoonful doses of milk of magnesia, given at hour intervals, until three teaspoonfuls have been given, will probably be retained.

Sponge baths of 95% alcohol and water, equal parts, at 90° F., will reduce the fever and make the child more comfortable.

CASE 29. Robert M. was the first child of healthy parents. He was born at full term after a normal labor, and weighed six pounds and ten ounces. He was nursed entirely for a month, digested well, and went up to seven pounds and fourteen ounces. The breast-milk then began to diminish and was helped out by a home-modified milk which contained 3.50% of fat, 6.00% of sugar and 0.70% of proteids. The baby soon began to have the colic and lose weight, while the stools contained large tough curds, showing casein indigestion. The breast-milk then gave out entirely and he was given a milk mixture prepared with Eskay's Food, which contained 3% of fat, 3.50% of sugar, 0.75% of proteids and 2% of starch, alternating with barley water, containing 1.50% of starch. Possibly because of the starch in the Eskay's Food and barley water he ceased to pass the large tough curds, but began to vomit and to lose weight steadily. When two months old he was taken to a hospital, where he remained until he was five months old. While there he was fed on various milk mixtures and improved somewhat. He continued to vomit, however. His weight on leaving the hospital was eight pounds and twelve ounces. He was then put on a modified milk of unknown composition prepared with Mellin's Food. This, of course, practically amounts merely to the substitution of malt sugar for milk sugar in the milk mixture. He gained at first to nine pounds, but soon began to refuse his food, vomit and lose weight again. He was then given a mixture of one-third gravity cream and two-thirds barley water, which is equal to a mixture containing 5% or more of fat, 1.50% of sugar, 1.15% of proteids and 1.00% of starch. He gained again for a time, but soon began to vomit more than before. A malted milk mixture was then given. This, like the Mellin's Food mixture, amounted to little more than giving malt sugar in place of milk sugar. He kept this down and gained for a time, but soon began to vomit worse than ever. The doctor then said that the baby " could not take cow's milk," and put him on Allenbury's Food No. 1, prepared according to directions. This was about a week before he was seen. The composition of the mixture was, according to the proprietor's figures, 3.33% of fat, 10.20% of lactose,

1.00% of albumin and 1.12% of casein. He had a great deal of gas after beginning this and continued to vomit. The bowels, which had been somewhat constipated, became loose, and the movements, which had been of good character, were undigested and contained a good deal of mucus. He was taking seven or eight feedings of from four to four and one-half ounces of the Allenbury's Food mixture, at two and one-half-hour intervals, when he was seen in consultation, when seven months old.

Physical Examination. He was bright and happy. He was small and poorly nourished, but of good color. The skin was in good condition. The fontanelle was 3 cm. in diameter and level. There was no rigidity of the neck. He had no teeth. The mouth, tongue and throat were normal. The heart and lungs were normal. The abdomen was large but not tense. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The lower border of the stomach did not reach to the navel. The stomach was not visible even after taking his bottle, and there was no visible peristalsis. The abdomen was negative. There was a small umbilical hernia. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and lively; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The weight was nine pounds and four ounces.

Diagnosis. The physical examination shows nothing abnormal except the signs of malnutrition. The diagnosis must be made, therefore, on the history. The continued vomiting shows that the gastric digestion was disturbed. The normal character of the movements up to the last change in the food shows that the intestinal digestion was not affected until the very end. The tendency to constipation was presumably due to the facts that much of the food was vomited and that the portion which passed into the intestine was so small that little residue was left to form feces. The diagnosis is, therefore, CHRONIC GASTRIC INDIGESTION.

It is very difficult in this instance to draw any very definite conclusions as to what element or elements of the food were at fault. In general, the percentages of the fat were not

excessive, most of the time being below 3.50% and only once above 4%. The proteids were usually both absolutely and relatively high. The sugars were at times excessive, especially in the last mixture, which contained over 10% of lactose. The increase in the amount of gas at this time and the change for the worse in the character of the movements suggest that sugar was not well borne. The food at times contained more starch than many babies of this age can digest. The symptoms were no more marked at such times, however, than they were when there was no starch in the food. The only conclusions which can be drawn are that the baby is unable to digest large amounts of sugar, and, by exclusion, that the somewhat excessive amounts of starch in the food may possibly have played a part in the production of the trouble.

Prognosis. Chronic gastric indigestion is always a serious condition, one never to be regarded lightly. In this instance, however, the comparative mildness of the symptoms and the baby's reasonably good condition justify, barring accidents, a favorable prognosis.

Treatment. The best food for this baby, as for all babies suffering from chronic gastric indigestion, is good human milk. With it recovery is certain to be rapid. It is not a necessity in this instance, however, and the baby will probably recover in time without it. The best substitute for it is some modification of cow's milk. A doctor has said, however, that this baby "can't take cow's milk." Is this statement true in this instance, or is it ever true? The author believes that it is extremely unusual for a baby to be born with an idiosyncrasy against cow's milk. He also believes that the improper use of cow's milk may develop a temporary, but not a permanent, intolerance for cow's milk. There is nothing in this baby's history, however, to show that it cannot digest cow's milk, if properly modified to suit its digestive capacity, most of the modifications which it has had in the past having been unsuitable in some way or other.

The only definite indications to be drawn from the history of this baby as to the regulation of the food are to keep the sugar comparatively low and not to give starch. On general principles, it is advisable to keep the fat a little low when

babies are vomiting. It is wiser, therefore, not to give this baby more than 2% of fat at first. In chronic gastric indigestion the food should, if possible, be so regulated as to diminish the work of the stomach and throw it on the intestine. The addition of an alkali to the food retards the coagulation of casein by rennin and allows the liquid milk to pass into the intestine, thus throwing the work of digestion from the stomach on to the intestine. If the lime water, the alkali most often used, is equal to 50% of the milk and cream in the mixture, it practically prevents the coagulation of the casein and throws all the work on the intestine. If the lime water is 25% of the milk and cream, it throws a proportionate part of the work on the intestine, and so on. It is evident that as the important relation is between the casein and the lime water, and as the milk and cream are the only substances in the mixture containing casein, the amount of lime water to be added must be calculated in relation to the milk and cream and not in relation to the total quantity of the mixture, which is made up largely of water, or to whey, which contains no casein. Lime water is indicated in this instance, therefore, and in the proportion of 25% of the milk and cream in the mixture. Whey proteids are not acted on by rennin, leave the stomach quickly and throw but little work upon it. They are, therefore, indicated in this instance. The following formula meets these indications:

Fat,	2.00%
Milk sugar,	5.50%
Whey proteids,	0.75%
Casein,	0.25%
Lime water,	25.00% of the milk and cream.

Four ounces is as much as he should have at a feeding. Eight feedings, at two and one-half hour intervals, gives 103 calories per kilo, and 2.3 grams of proteid per kilo, which covers both the caloric and proteid needs.

If whey mixtures are not satisfactory, pancreatization of suitable milk and cream mixtures may be tried.

No drugs are indicated. The symptoms at present are hardly severe enough to require lavage.

CASE 30. Frances M. was an only child. Her parents were neurotic and her father was a chronic dyspeptic. She was breast-fed and was perfectly well during infancy and until she was six years old. Since then she had had more or less disturbance of the digestion. Her appetite was usually good, but she ate hurriedly, did not chew her food and was in the habit of washing it down with water. Her diet was a reasonably good one. Her tongue was often coated and her breath foul. She had hiccoughs frequently and often belched gas and gaped. She was occasionally nauseated and at times vomited. Her mother had noticed no definite relation between these symptoms and the time of taking food. Her bowels moved regularly and the stools appeared normal, except that they were often a little loose. She did not go to school or play with other children, because her mother feared that she might contract some disease. She had some home lessons, however, and was out of doors much of the time. She had no rest in the middle of the day, but went to bed at seven and slept well. She was rather excitable. She had lost a little weight. She had had no other illnesses. She was seen when nine years old.

Physical Examination. She was tall and slim. Her color was good and her skin in good condition. Her tongue was nearly clean. Several of her teeth were decayed. The throat, heart and lungs were normal. Nothing abnormal was detected in the abdomen. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. Her weight without her clothes was fifty pounds and six ounces, which is equal to about fifty-four pounds with her clothes and is about three pounds below the average for her age. Her height without her shoes was fifty and one-half inches, which is about one inch above the average.

The urine was normal in color, clear, acid in reaction, of a specific gravity of 1020 and contained no albumin or sugar.

Her stool was of medium size, soft, homogeneous, brown, foul and alkaline in reaction. Microscopically it showed no starch, a few meat fibres and a very little fat in the form of

soaps. The meat fibres and soaps were, however, not in excess of the normal limits.

Diagnosis. The symptoms of indigestion are gastric rather than intestinal. The stool shows no evidence of intestinal indigestion. The diagnosis of CHRONIC GASTRIC INDIGESTION is, therefore, warranted. The neurotic inheritance, the bad example of the father, the lack of companionship and occupation, the failure to chew her food properly and the washing it down with water have probably all played a part in its causation.

Prognosis. The symptoms are not very marked, her general condition is but little impaired and many of the causative factors are remediable. The outlook for a speedy recovery is, therefore, very good.

Treatment. There are no very definite indications as to what food elements will or will not agree with her. She should, therefore, be given a simple, easily digested diet. It will be well, on general principles, to keep the fat very low, as fat tends to delay the stomach digestion. The following list is a reasonable one for her:

Skimmed milk.	White bread.	Butter — very little.
Soft boiled eggs.	French bread.	String beans.
Dropped eggs.	Plain crackers.	Asparagus.
Scrambled eggs.	Educators.	Spinach.
Lamb chop.	Milk toast.	Beet greens.
Mutton chop.	Strained oatmeal.	Peas.
Beef steak.	Cream of wheat.	Summer squash.
Roast lamb.	Wheat germ.	Stewed celery.
Roast mutton.	Germea.	Grapes.
Boiled mutton.	Ralston.	Orange juice.
Roast beef.	Farina.	Junket.
Roast chicken.	Rice.	Baked custard.
Boiled chicken.	Hominy.	Corn starch pudding.
Broiled chicken.	Cracked wheat.	Bread pudding.
Boiled fish.	Baked potato.	Rice pudding.
Broiled fish.	Plain macaroni.	Plain blanc mange.

It will, in all probability, have to be modified somewhat in the future to fit her individual case. Careful observation of her symptoms and repeated examinations of the stools in connection with a complete record of the food taken will show

what these modifications should be. She will require about 1350 calories daily to cover her caloric needs. She should have three meals and no lunches. She must be made to eat slowly and to chew her food properly. She must not be allowed to wash her food down with water or other liquids. There is, however, no objection to her drinking water with or after her meals. She must be encouraged to drink water between her meals.

It will be well for her to go to school half a day in order that she may have occupation and companionship. She must also, and for the same reason, be allowed to play with other children. It will be wise for her to rest an hour after her dinner.

There is nothing about the symptomatology to suggest gastric hyperacidity and the symptoms are not severe enough to point to sufficient hypoacidity to call for the administration of hydrochloric acid. Pepsin is always present if there is hydrochloric acid and pancreatin is destroyed in the stomach. Her appetite is good. There is, therefore, no indication for the administration of drugs.

She should have her teeth filled.

CASE 31. Edward C., six years old, was the third child of healthy parents. The two other children were living and well and there had been no miscarriages. There was a history of tuberculosis in his father's family, but he had had no known exposure to it. He was born at full term, after a normal labor, was normal at birth and weighed seven pounds. He was constipated from birth. The physician, who attended him at this time, said that there was a growth about a finger's length up the bowel. The mother said that with her little finger she could just reach something which felt like a ring. An attempt was made to dilate this constriction by the introduction of the finger, first by the physician and then by the mother, once or twice a week during the first year. Nothing of the sort had been done since then. The constipation had continued up to the present time. Variations in the diet had no effect upon it. All sorts of drugs had been tried, but none of them had worked as well as enemata. He never had a movement without help. The stools were usually small in diameter, dark-colored and well digested. They were sometimes in very small pieces, like sheep dung, but never in the form of large balls. There was sometimes a little mucus on the outside of the stools, but never any blood. The only time in his life that he had had loose movements was once when he had eaten a great many pears. He had had attacks of vomiting ever since he was weaned, when six months old, which were apparently due to blocking up of the bowels, as they always ceased when the bowels moved. His abdomen began to enlarge when he was two and one-half years old. It had, on the whole, grown steadily larger, although it varied in size from day to day. The swelling was at first most marked in the lower portion, but recently the upper portion had seemed the larger. There was at times visible peristalsis. He very seldom had any pain, but often passed a great deal of gas from the anus. He had developed well in other ways. He cut two teeth when he was four months old, walked at sixteen months and talked early. He was active and was able to run about and play with the other boys, although he became short of breath if he exerted himself much.

Physical Examination. He was tall and thin. The lips and nails were of good color. He was perfectly normal mentally. The tongue was clean, the teeth poor. The abdomen was enormous, the chest and extremities appearing like appendages to it. The heart was of normal size, but it was displaced a little upward and to the left. The sounds were normal. The lungs were normal. The upper border of the liver flatness was at the upper border of the fifth rib. The lower border of the liver dullness was two cm. above the costal border. The spleen was not palpable. The abdomen was enormously distended, the distention being greatest in the upper portion. The distention was at times uniform; at others, slight waves of peristalsis were visible with deep sulci between them. The abdomen was everywhere tympanitic. There was no tenderness or muscular spasm and no tumors were felt. The following measurements were taken:

Circumference of chest at nipples,	61 cm.
Circumference of abdomen at navel,	64 cm.
Circumference of abdomen at level of anterior superior spines,	55 cm.
Greatest circumference of abdomen,	74 cm.

The extremities were normal except for their small size. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

A stool, which was seen, was smooth, dark-colored and about the size and shape of the finger.

Diagnosis. The distention of the abdomen is unquestionably due to dilatation of the intestines. It is reasonable to believe that this dilatation is due primarily to a congenital narrowing of the rectum, and that the large intestine only is involved. It is possible that there was also some other congenital malformation of the large intestine, but the late development of the enlargement of the abdomen makes this improbable. It is not quite proper, therefore, to speak of this as a CONGENITAL DILATATION OF THE COLON or HIRSCHSPRUNG'S DISEASE, in which the condition is primarily a congenital malformation of the whole or a part of the large

EDWARD C. Case 31.

intestine. Whatever the origin, however, the present condition is now the same as in the typical cases of this type.

Prognosis. His general condition is better than would be expected from the duration of the disease and the size of the abdomen. There is no possibility of spontaneous improvement. Drugs and enemata are merely palliative measures. Ulceration of the intestine or marked toxemia from retention of the intestinal contents is almost certain to develop eventually and to finally cause death. There is a possibility of cure by operation. The operation, is, however, a serious one and more than likely to result fatally.

Treatment. He can be kept alive and fairly comfortable for a considerable time by the combined use of enemata and massage of the abdomen. Sooner or later, however, these measures will prove ineffectual and it will be necessary to operate upon him or to let him die without operation. The operations possible are the making of an artificial anus and the removal of the large intestine. The former operation is merely palliative, not curative, and, if successful, is a source of great discomfort. The removal of the colon is a very serious operation and very likely to prove fatal. If successful, however, it results in a cure.

CASE 32. Mary D., five and one-half months old, had always been a perfectly well, breast-fed baby. About 6 A.M., September 6, she suddenly began to cry and to put her hands on her abdomen. The crying continued for half an hour or more. At about this time she had three movements consisting almost entirely of bright blood. After this she vomited two or three times. The character of the vomitus was not noticed. Judging from the story, she evidently was somewhat collapsed for a short time after the onset of the pain. She was seen about 7.30 A.M. by her physician, who examined the abdomen but found nothing abnormal. He did not consider the condition an important one, although he watched the case very carefully afterward. She continued to have seven or eight small movements daily, which consisted entirely of mucus and blood. The amount of blood, however, had steadily diminished. The movements contained no fecal matter. A bismuth mixture, which was ordered at the first visit, was vomited. There was no more vomiting until the noon of the 8th, since when she had vomited almost constantly. She continued to take the breast well. She had had no very sharp attacks of pain, but had slept very little, moaning most of the time. She did not seem very sick until the 8th and had noticed things and played a little that afternoon. The temperature had been taken morning and evening, but had never been over 100° F. The mother thought that she felt a bunch in the abdomen the evening of the 7th, but both the mother and the doctor failed to find it the next morning. She was given two teaspoonfuls of castor oil the morning of the 8th, which were vomited, and also several large injections of salt and water, which brought away nothing but mucus and blood. She was seen in consultation at 9 P.M., September 8, sixty-three hours after the onset.

Physical Examination. She was well developed and nourished. There was slight pallor. Her face was drawn and anxious. She noticed a little. The fontanelle was nearly level. The tongue was slightly dry, but not coated. The heart and lungs showed nothing abnormal. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The level of the abdomen was

somewhat below that of the thorax. An indefinite resistance was felt in the left lower quadrant. There was no muscular spasm, but a little tenderness in this region. The rest of the abdomen was negative. Rectal examination showed more resistance in the left half of the abdomen than in the right, but nothing at all definite. The extremities showed nothing abnormal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100.4° F., the pulse 180.

Diagnosis. The diagnosis of INTUSSUSCEPTION is so plain in this instance that it is hard to understand how it could have been mistaken for infectious diarrhea, as was done. The sudden onset of severe abdominal pain with partial collapse, the vomiting and the passage of bright blood are pathognomonic of intussusception and entirely different from the slow onset of infectious diarrhea. The further course of the disease, with continued abdominal pain and numerous stools of mucus and blood without fecal matter, is most characteristic. Pain is uncommon, except at the time of defecation, in infectious diarrhea at this age, and some of the movements always contain fecal matter. The physician was undoubtedly misled by the facts that the baby nursed well and did not appear very ill. It is, however, not at all uncommon for babies with intussusception to take their food well almost to the end, and the general condition is often not much affected during the first thirty-six hours or so. He was also probably further misled by the moderate temperature. This, again, is characteristic of intussusception, high fever being very unusual. He should have paid more attention to the mother's story of a bunch in the abdomen and not have trusted so much to his own negative examination, for it often happens that the tumor can be felt at one time and not at another. The failure to obtain fecal matter from the injections should also have suggested intussusception. The castor oil was, of course, very bad treatment. If it had been retained, it would have merely made the intussusception tighter.

The physical examination, as often happens in intussusception, aids but little in the diagnosis. The strained and anxious

face are suggestive of intussusception, but not inconsistent with infectious diarrhea. The indefinite resistance and slight tenderness in the left lower quadrant and the increased resistance in the left half of the abdomen on rectal examination are corroborative of the diagnosis of intussusception, but without the history would not be of much importance.

Prognosis. The prognosis is very grave. It is almost certain that during the sixty-three hours since the onset adhesions have formed so that the intussusception cannot be reduced. The circulation has been interfered with so long that the gut is almost certainly gangrenous. A resection will undoubtedly have to be done. There is not one chance in ten for recovery.

Treatment. The only possible treatment is immediate operation.

CASE 33. Sophie M., nine months old, was the child of healthy parents. She was born at full term after a normal delivery and had always been well. She had been nursed irregularly, but had had no other food except occasionally a little zwiebach.

She woke up from a nap crying, evidently from pain in the abdomen, about noon, April 11. She was pale for some time after she ceased crying. She had nursed well since then but had vomited everything taken, including a number of cathartics, almost immediately. The vomitus consisted of the food taken, with a little water and mucus; it was never greenish or brownish. She had had no fecal movement of the bowels, although numerous enemata had been given. Once she had passed " a small glassful of clear blood." She had apparently not been much feverish and had apparently not had any pain since the onset. She had passed very little urine. She was seen at noon, April 13, forty-eight hours after the onset.

Physical Examination. She was well developed and nourished and a little pale. She was moderately prostrated, but her face was not pinched and her eyes were clear. The anterior fontanelle was slightly depressed. The pupils were equal and reacted to light. There was no rigidity of the neck or neck-sign. The tongue was rather dry, but not red or coated. The throat was normal. The heart and lungs were normal. There was no rosary. The liver was just palpable. The spleen was not palpable. The level of the abdomen was a little below that of the thorax. There was no definite muscular spasm, but the whole abdomen was held a little rigidly, especially in the right lower quadrant. There was no tenderness or dullness. Nothing at all definite could be made out in the right lower quadrant, but it seemed as if there was a little more resistance there than on the other side. Rectal examination showed nothing abnormal. The rectum was empty. There was no blood on the examining finger. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign.

There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F., the pulse 136.

Diagnosis. The diagnosis in this instance lies between acute gastric indigestion, with secondary constipation, and intussusception. The points in favor of intussusception are the sudden onset in a breast-fed baby, the continued vomiting, the absence of fecal movements, the history of the movement of blood, and the slight rigidity and sense of resistance in the right lower abdomen. The points against intussusception are the character of the vomitus, the slight amount of prostration, the absence of an abdominal tumor, the negative rectal examination and the low temperature. It may also be argued that the history of the passage of " a small glassful of clear blood " was probably untrue, and that if the baby had passed blood once it would certainly have passed it again if the condition was intussusception. The small amount of urine is, of course, of no importance, merely meaning that very little fluid was retained.

There is no question as to the validity of the objections to the diagnosis of intussusception. They are, however, all unimportant compared with the almost pathognomonic combination of the sudden onset of abdominal pain in a breast-fed infant, the constant vomiting, the obstipation and the passage of blood. These are positive symptoms; the others are merely negative. The absence of fecal vomiting can be explained on the ground that the reverse peristalsis is not very active; the absence of frequent movements of blood and mucus, on the ground that the constriction is not very tight, and that consequently there is not much congestion or exudation into the bowel, and not much peristalsis set up. The absence of a tumor can be explained by the absence of a very tight constriction or of marked swelling, or by the deep location of the tumor; the absence of a tumor on rectal examination, by the high position of the intussusception; and the low temperature by the absence of absorption.

These signs are so characteristic of INTUSSUSCEPTION that it is hardly necessary to attempt to rule out other forms of intestinal obstruction. Some other form is, however, a possibility. Fortunately, the treatment is the same in any instance.

Prognosis. The chances for recovery are about even in this instance, with a good surgeon, if operation is done at once.

The absence of fecal vomiting and frequent movements, the good general condition, the low temperature and the short duration of the intussusception are all favorable points.

Treatment. The only rational treatment for intussusception at any stage is immediate operation as soon as the diagnosis is made. Attempts at reduction by inflation of the bowel with water or air are in rare instances successful. In the vast majority of cases, however, they are unsuccessful, they waste time and use up the child's vitality. It is impossible, moreover, to know at once whether the intussusception has been reduced or not by these measures, so that on this account still more time is wasted. An early operation is usually successful, because at this time the intussusception can be easily reduced, while the dangers from opening the abdomen are slight in skilled hands. When the operation is delayed, the intussusception can usually not be reduced because of adhesions, and the bowel is irreparably damaged. A resection has to be done or an artificial anus made. Under these circumstances the baby almost invariably dies.

CASE 34. Virginia P., seven months old, had always been a perfectly well, breast-fed baby. She began to vomit about 6 P.M., November 4. She had a perfectly normal movement from the bowels at 7 P.M. When seen by her physician, at 7.30 P.M., she was somewhat stupid, but not at all collapsed. The physical examination was negative, except for a little more resistance in the left lower abdomen than elsewhere. The rectal temperature was normal. She was very restless all night, apparently from pain in the abdomen. She vomited both of two nursings and also water which was given her from time to time. She had seven movements, consisting entirely of mucus and blood, during the night. Irrigation of the bowels at 9 A.M., November 5, brought away nothing but a little blood. She was seen in consultation at 12 M., November 5. She had not vomited since 5 A.M., although she had taken water freely, and the bowels had not moved since the irrigation.

Physical Examination. She was very fussy, but apparently not in pain. The mouth was dry, the tongue clean. The anterior fontanelle was level. The heart and lungs were normal. The lower border of the liver was just palpable in the nipple line. The spleen was not palpable. The level of the abdomen was below that of the thorax. Examination of the abdomen was very difficult because of the constant crying, but it was finally decided that there was no tenderness, spasm or tumor. Rectal examination showed nothing abnormal, but the withdrawal of the finger was followed by the discharge of a teaspoonful of dark reddish-brown water. The extremities showed nothing abnormal. The rectal temperature was 100.2° F.; the pulse, 116.

A positive diagnosis of intussusception was made and immediate operation advised. When the surgeon saw her, an hour later, she was asleep and a careful examination of the abdomen showed nothing abnormal. When she awoke she was bright and happy and acted like a normal baby. She seemed so well that he thought that the intussusception had probably been reduced by the irrigation, or spontaneously during the ride to the hospital, and declined to operate unless further symptoms developed.

She was seen again in consultation at 4 P.M. She had taken water freely and had not vomited. She had had no food since 5 A.M. The bowels had not moved; neither had she passed gas. She had had no pain and had slept a little. She was smiling and playing in the nurse's arms and looked well, but a little tired. The abdomen was soft, there was no tenderness, spasm or tumor. A gush of dark reddish-brown water followed the introduction of a suppository. The rectal temperature was 102.2° F.; the pulse, 118.

Diagnosis. There is no doubt that she had an intussusception. The question is whether it is still present or has been reduced. The points in favor of its having been reduced are the cessation of the vomiting and bloody movements, the absence of pain and tumor, the negative rectal examination and the marked improvement in the general appearance. The arguments in favor of the intussusception being still present are as follows: Reduction by a simple irrigation is very unusual. Spontaneous reduction, while it may occur, takes place so rarely that it is wiser to take it for granted that it never happens. Remissions in the subjective symptoms are very common, especially in the first thirty-six hours. Pain is seldom present after the onset. The tumor cannot be felt if it is situated high up under the diaphragm or liver. Rectal examination is always negative unless the tumor is low down. There have been no fecal movements. The cessation of vomiting is due to the abstinence from food. The temperature is rising in spite of the apparent improvement in the subjective symptoms. It may be said in rebuttal, however, that there has not yet been time for feces to appear and that the rise in temperature is due to starvation and fatigue. It is evidently impossible to be absolutely sure whether the intussusception has been reduced or not. The question must be decided by weighing the chances on the two sides. The relative frequency of remissions in the subjective symptoms must be balanced against that of spontaneous reduction and reduction from simple irrigation. The other points can be explained either way and are, therefore, of no importance. Remissions are infinitely more common than spontaneous reduction or re-

duction from simple irrigation. The chances are, therefore, very much in favor of the persistence of the intussusception, so much so that the diagnosis of an UNREDUCED INTUSSUSCEPTION is justified.

Prognosis. The prognosis without an operation, if the diagnosis is correct, is hopeless. She is in good condition; the intussusception occurred less than twenty-four hours ago; the symptoms are not very acute. It is probable, therefore, that the intussusception can be reduced and that a resection of the bowel will not be necessary. The chances for recovery are, therefore, better than even.

Treatment. She should be operated on immediately. It is true that the operation may be found to be unnecessary. There is very little risk, however, in an exploratory laparotomy, while she is certain to die if not operated upon, if the intussusception is still present.

CASE 35. Walter R., eight years old, had always been well, except for whooping-cough when three years old. He was very constipated until he was four years old, the stools being made up of masses of hard "bullets." These little bullets would often slip out into his trousers when he was running and playing. During this time he was given enemas constantly, many of them being high. Since then the stools had been formed, but not hard, the only abnormality about them being their large size. He was, however, often unable to hold them when playing, although he never dirtied himself when quiet or asleep. His lapses were not due to carelessness, because he always felt very badly about them and punishment had made no difference. The attempt had been made to prevent these accidents by forcing him to have a movement directly after breakfast. He rarely succeeded, however, and the straining in the attempt to have a movement apparently made matters worse, because he almost always had an involuntary movement soon after. The frequency of the accidents varied. Sometimes he went several weeks without one; at other times they occurred almost every day, while during the previous summer he went several months without trouble. His appetite was good, his diet admirable and he had no symptoms of indigestion. He lived an ideal out of doors life in the country, was not overstimulated mentally and showed no signs of nervousness.

Physical Examination. He was well developed and nourished and of good color. He seemed of average intelligence and not at all nervous. His tongue was clean, his mouth and throat normal. The heart and lungs were normal. The level of the abdomen was that of the thorax; nothing abnormal was detected in it. The liver and spleen were not palpable. The genitals were normal. The prepuce was completely retractible and there was no local irritation. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no disturbance of the sensation. The peripheral lymph nodes were not palpable. Rectal examination showed nothing abnormal. The tone of the sphincter seemed normal.

Diagnosis. The trouble is, of course, INCONTINENCE OF FECES. The important question is its cause. It is evidently not due, as in some instances, to distention of the rectum with hard feces. Judging from his good general condition and apparently stable nervous system, it is not due to debility or lowered nervous tone. There are no signs of local irritation. It is probably due, therefore, to delayed development of the normal control of the sphincter ani. It is possible, however, that the constipation during the early years and the continued use of enemas may have played a part in its production by interfering with the normal processes of defecation.

Prognosis. The prognosis is good with time. The condition is, however, a disagreeable and annoying one, which should be stopped as soon as possible.

Treatment. There is nothing about his diet or daily routine which needs to be changed. There is no indication for tonics or nerve stimulants or sedatives, as his general condition is good and there is no evidence of any general disturbance of the nervous system. The treatment must be directed toward the development of the control of the sphincter muscle. This can best be done by teaching him to contract and relax the sphincter at will and by practice in doing it. There ought not to be much difficulty in teaching him to do this, as he is eight years old and of normal intelligence. It is possible that the application of the faradic current to the sphincter, every other day, may also be of assistance.

CASE 36. Malcolm B., the third child of healthy parents, was born at full term after a normal labor. He was normal at birth and weighed eight pounds. He was nursed for nine months, but during the last two months had had one or two feedings of modified milk daily in addition. He was then weaned and given an unmodified top milk, which contained about 7.50% of fat, 4.50% of sugar and 3.50% of proteids. The bowels, which had previously moved regularly, immediately became constipated, enemata, suppositories or some drug being always required to get a movement. The movements were white, dry and crumbling and had a disagreeable acid odor. There was no vomiting. He took nothing but this top milk, except occasionally a little broth with rice, until he was fourteen months old. He was then changed to five feedings of seven ounces of a top milk and Mellin's Food mixture, which contained about 5.70% of fat, 6% of sugar and 3% of proteids, and after about three weeks was given a little beef juice in addition. The constipation was rather less marked on this diet but still very troublesome. He was seen when fifteen months old.

Physical Examination. He was well developed and nourished, but flabby and a little pale. The fontanelle was 2 cm. in diameter. He had seven teeth. His tongue was clean. There was no rosary. The heart and lungs were normal. The abdomen was negative, its level a little below that of the thorax. The liver was just palpable. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. The weight was twenty-two pounds and eight ounces.

Diagnosis. The chief trouble is, of course, CONSTIPATION. Constipation is, however, really a symptom and not a disease. It is not a satisfactory diagnosis unless modified by some term denoting the cause of the constipation. In this instance the cause of the constipation is very evident, namely, the excessive amount of fat in the food. No more than four per cent of fat should ever be given; he was getting nearly twice that. The white, dry and crumbling stools are most

characteristic, being composed of unutilized fat in the form of soaps. The improvement after the change of food, one result of the change being a reduction in the amount of fat, is further evidence that an excess of fat was the cause of the constipation. A part of the improvement may possibly, however, be attributed to the malt sugar in the Mellin's Food and the beef juice, both of which usually have a laxative action. The flabbiness of the skeletal muscles indicates an additional atonic element in the etiology, because, when the skeletal muscles are feeble, the intestinal muscles are usually in the same condition.

Prognosis. The prognosis is good for rapid recovery, because the chief cause of the trouble, the excess of fat in the food, can be removed at once.

Treatment. The treatment is, of course, primarily by regulation of the diet to remove the cause of the trouble. Whole milk, or whole milk with an ounce of oat water to each feeding, will probably give a sufficiently low fat. He is old enough to have something beside milk; in fact, babies of his age are almost certain to do badly in some way if they do not have something to eat beside milk. A reasonable diet to start him on is as follows:

Whole milk or whole milk with oat water.

Beef juice, one or two tablespoonfuls; or

Mutton or chicken broth, two to four ounces, once daily.

Bread or zwiebach in broth or beef juice.

Barley jelly, oat jelly, farina or rice, one to three tablespoonfuls twice daily.

Orange juice, one to three tablespoonfuls, once daily.

While regulation of the diet is removing the cause of the trouble, it may be necessary to relieve the symptom, constipation, for a time by the use of enemata of suds or sweet oil, suppositories of soap, glycerin or gluten, or milk of magnesia, in doses of from one-half to one teaspoonful once or twice daily.

It goes without saying that fresh air, a good routine and everything which tends to improve the general condition will aid in the relief of the constipation by improving the muscular tone and removing the atonic element.

Massage of the abdomen for five or ten minutes morning and night will stimulate the intestinal peristalsis and help to strengthen the abdominal muscles. The baby is old enough to be trained to have a movement at a regular hour and to use his muscles in defecation. From four to six ounces of water daily between his meals will also be of service.

CASE 37. Robert A., fifteen months old, was the first child of healthy parents. He was breast-fed during the first year and was not constipated during this time. He was then given a mixture of Mellin's Food and milk and became very much constipated. After that he was given Imperial Granum, and other articles of diet were soon added. When seen he was taking milk, oat jelly, bread, orange juice and Bovinine. The bowels did not move except with the aid of gluten suppositories. The movements were large, brown or yellow in color, coated with mucus, and usually had bright blood on the outside. Defecation was very painful. During it the child became cold and perspired and stiffened out. Otherwise he was well. He sat up but did not creep or try to stand. He apparently did not have too large an amount of food.

Physical Examination. He was good-sized but fat and flabby. The muscles seemed poorly developed. His color was good. The fontanelle was nearly closed. The tongue was clean. He had twelve teeth. There was a slight rosary. There was also a slight retraction of the chest at the insertion of the diaphragm. The abdomen was not distended and was perfectly lax. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal except for a slight enlargement of the epiphyses at the wrists. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The genitals were normal except that the prepuce was rather tight. There was a crack at the edge of the anus, both back and front, about one quarter of an inch long and one eighth of an inch deep. This crack bled easily when the anus was stretched. Rectal examination was negative.

Diagnosis. The diagnosis of constipation is, of course, evident. This diagnosis is, however, not sufficient. It is necessary to determine the type and the cause of the constipation. The pain during defecation and the bright blood on the outside of the movement are almost enough of themselves to justify the diagnosis of fissure of the anus without physical examination. This condition is, of course, proved by the

physical examination. The fissure and the pain caused by it are, therefore, the cause of the constipation, and the constipation is of the spasmodic type. The large size of the movements suggests some other etiological factor. This suggestion is corroborated by the facts that the child does not creep or try to stand, and the general flabbiness. That is, the muscular development is poor. It is fair to assume that the intestinal muscles are also weak and the intestinal peristalsis feeble. The constipation is, therefore, partly of the atonic type. The cause of the weakness of the muscles is shown by the rosary, the retraction of the lower chest and the enlargement of the epiphyses at the wrists, all of them manifestations of rickets. The final diagnosis is, therefore, CONSTIPATION, chiefly OF THE SPASMODIC TYPE; FISSURE OF THE ANUS; MILD RICKETS. An interesting point is that the malt sugar in the Mellin's Food, which usually acts as a laxative, had the opposite effect in this instance.

Prognosis. The prognosis is perfectly good with time and proper treatment. The fissure should heal in a few weeks with very simple treatment. Stretching the sphincter is almost never necessary. It will probably take somewhat longer to relieve the constipation because, on account of the pain in the past, the child will continue to be afraid to have a movement even after the fissure is healed, and the atonic element will remain after the spasmodic element is relieved. The active stage of the rickets, shown chiefly by the weak musculature, should yield quickly to treatment. The bony signs will persist for many months but will eventually disappear.

Treatment. The first object of the treatment is to heal the fissure. To do this, it is first necessary to keep the movements soft. Until this is accomplished by regulation of the diet, it can best be done with an enema of an ounce of sweet oil daily. If this is not effectual, he may be given one or two teaspoonfuls of milk of magnesia in his milk daily. Local cleanliness and the application of boracic acid ointment will then quickly heal the fissure. It will almost certainly not be necessary to stretch the sphincter.

A rational routine and diet for him will be as follows:

6 A.M. Whole milk, 8 ounces.

9 A.M. Orange juice, 2 tablespoonfuls.

10 A.M. Oat jelly, 2 or 3 tablespoonfuls. Whole milk, 10 ounces.

2 P.M. Mutton or chicken broth, 3 ounces; or beef juice, 2 tablespoonfuls. Bread or zwiebach, 1 slice. One-half baked apple or 2 tablespoonfuls of prune juice. Whole milk, 4 ounces, if desired.

6 P.M. Oat jelly, 2 or 3 tablespoonfuls. Whole milk, 10 ounces.

Water should be forced.

Massage of the abdomen twice daily will stimulate the peristalsis and improve the muscular tone. Much fresh air and sunlight will help the rickets and general condition, and hence the atonic element of the constipation. Tincture of nux vomica, in drop doses, three times a day, before meals, will also tend to improve the general condition and the intestinal tone.

CASE 38. Charles B., seven and one-half years old, was not very carefully fed, but had not been especially indiscreet just before the onset of this illness. He had had a number of similar attacks in the past.

He complained of pain in his stomach in the late afternoon of December 2, and vomited a considerable amount of undigested food and mucus mixed with bile. His temperature that night was 104° F. He nevertheless slept well. He vomited several times during the next two days and the vomitus always contained bile. The bowels did not move either day, as all the drugs given were vomited. His temperature ranged between 100° F. and 102° F. He had no pain. He did not seem very sick, but did not care to get out of bed. He did not want anything to eat, but had taken a little milk and broth. A dose of Epsom salts given on the morning of the 5th was retained and resulted in several large, loose, gray or light grayish-yellow movements, which had a very foul odor, but did not contain undigested food or mucus. Slight yellowishness of the conjunctivæ was noticed that afternoon. He was seen at 4 P.M., December 5.

Physical Examination. He was well-developed and nourished and perfectly clear mentally. He was a little pale. The conjunctivæ had a slight yellow tinge. The tongue was moist and moderately coated; the papillæ were unusually distinct. The mouth and throat were normal. There was no rigidity of the neck. The heart and lungs were normal. The level of the abdomen was below that of the thorax. There was no muscular spasm or tenderness and no masses were felt. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line. The liver was palpable just below the costal border in the nipple line. It was not tender. The gall-bladder was not palpable and there was no tenderness in this region. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99.2° F.; the pulse was 80.

The urine was clear and dark reddish yellow in color; when

shaken the froth was yellow. The reaction was acid; the specific gravity, 1,024. It contained neither albumin, sugar nor acetone. The sediment showed nothing abnormal.

Diagnosis. Inflammation of the gall-bladder and gallstones are extremely rare at this age. The absence of pain and of enlargement and tenderness of the gall-bladder, together with the low temperature, exclude them in this instance. The vomiting of bile, the enlargement of the liver (which should not be palpable at this age), the yellowness of the conjunctivæ, the clay-colored stools and the dark urine are so characteristic of ACUTE DUODENAL INDIGESTION that it is hardly necessary to exclude other diseases. A number of other conditions ought, perhaps, to be considered, however, for the sake of completeness. These are, acute gastric indigestion, recurrent vomiting and appendicitis. None of them show jaundice, clay-colored stools or bile in the urine. There is none or very little fever in recurrent vomiting, and there are local signs in the abdomen in appendicitis. Tubercular meningitis should be thought of in this instance, as always when a child vomits. It can, of course, be excluded at once on the presence of the characteristic symptoms of duodenal indigestion and the absence of all signs of meningeal irritation.

Prognosis. There is, of course, no danger as to life. The most acute stage is already over. It will probably be one or two weeks, however, before bile reappears in the movements and convalescence really begins. During this time, while not seriously ill, he will be very miserable and irritable. If he is neglected or improperly treated, there is considerable danger that the condition will run over into chronic duodenal indigestion. He is almost certain to have more attacks in the future, unless great care is taken with his diet.

Treatment. The most acute stage being over, the treatment is now principally regulation of the diet. Experience has shown that these patients do best when they are fed almost entirely on proteids, the starches being kept low, and the fats and sugars entirely excluded. A reasonable diet for him at present is whey, skimmed milk, junket from skimmed milk, strained broths, beef juice, white of egg, and toast

bread and zwiebach in small amounts. Lean meat and simple cereals may be added to his diet as he improves; next, orange juice and green vegetables. It is always wise to wait longer than seems necessary before increasing the diet.

There is no drug which will diminish the swelling in the duodenum or at the orifice of the common bile duct. Time and rest of the duodenum by care in the diet will alone accomplish this. The so-called " cholagogues " are contra-indicated for two reasons: they do not increase the flow of bile and there would be no object in increasing it, if they did. Phosphate of soda in doses of a teaspoonful, more or less, is the best laxative. Tincture of nux vomica seems to be of some utility in these cases and is worthy of a trial. Seven drops, three times a day, before eating, is about the right dose for this patient.

He must be kept in bed and kept warm until convalescence is well established, because over-exertion and chilling are very apt to bring on a relapse.

CASE 39. Dorothy R. was the second child of healthy parents. The first child died in convulsions, when three months old. There had been no miscarriages. She was born at full term, after a normal labor, was normal at birth and was said to have weighed eleven pounds. She had never had anything to eat except her mother's milk. She seemed perfectly well until she was two weeks old, when she began to be jaundiced. The jaundice increased for two weeks until she was "brown all over," but she had been "getting bleached" during the last week. The stools were dark-green during the first few days of life, but were orange-yellow from this time until the appearance of the jaundice, when they became white. They continued to be white until a physician gave her some powders, after which they were blackish-green. The powders were stopped at the end of two weeks, since when the stools had been very light yellow in color. The urine had been brown since the appearance of the jaundice. She seemed somewhat drowsy during the first two weeks after the beginning of the jaundice, but had been brighter during the last week. She had, however, taken the breast well. Her mother did not know whether she had had any fever or not. She was admitted to the Children's Hospital when five weeks old.

Physical Examination. She was well developed and fairly nourished, and acted like a normal baby of her age. The skin, mucous membranes and conjunctivæ were deeply jaundiced. There were a few hemorrhagic spots in the roof of the mouth and a small ecchymosis on one foot. The heart and lungs were normal. The upper border of the liver flatness in the nipple line was in the fourth space. The lower border of the liver was palpable five cm. below the costal border in the same line. The spleen was not palpable and the abdomen was normal. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F.; the pulse, 128; the respiration, 30. She weighed eight pounds.

The urine was greenish-brown and feebly acid in reaction. It contained no albumin or sugar, but a large amount of bile.

The stools were smooth and light yellow in color. There was a slight excess of fat in the form of fatty acids and soap. Bile was present by the corrosive sublimate test.

Diagnosis. Congenital obliteration of the bile ducts can be excluded by the late appearance of the jaundice, the absence of enlargement of the spleen, the yellow color of the stools and the presence of bile in them. Icterus neonatorum can be ruled out on the late appearance of the jaundice, the history of white stools, the presence of a large amount of bile in the urine and the enlargement of the liver. The late appearance of the jaundice, the white stools and the absence of enlargement of the spleen are inconsistent with congenital icterus. The good family history, the fact that she was born at full term, the absence of enlargement of the spleen and of other signs of syphilis and the white stools exclude congenital syphilis. If she had had a septic infection with this amount of jaundice she would have been much sicker, would not be in such good general condition and would not have had white stools. Acute duodenal indigestion is uncommon at this age, but does occur. The acute onset of jaundice, white stools and brown urine, without severe constitutional symptoms, in a previously well baby is most characteristic. The slight enlargement of the liver, the absence of enlargement of the spleen and the normal temperature are consistent with it. The presence of bile in the stools shows that the obstruction is no longer complete. She is, therefore, undoubtedly recovering from an attack of ACUTE DUODENAL INDIGESTION.

Prognosis. The prognosis is good. A rapid and uneventful recovery may be confidently expected.

Treatment. Her mother should continue to nurse her. She should be given eight feedings in the twenty-four hours, the intervals being two and one-half hours during the day and four and one-half at night. It will be well to give her one-half an ounce of water sweetened with saccharin before or with each nursing. This will serve to dilute the milk which, judging from the excess of fat in the stools, is somewhat rich in fat. There is no indication for the administration of drugs.

CASE 40. Russell H., three years old, was born at full term, was normal at birth and weighed ten and one-half pounds. His parents were healthy and there had been no known exposure to tuberculosis. He was breast-fed and when six months old weighed thirty pounds. His mother began to give him other food very early and for the past year his diet had been very unsuitable for a child of his age. He was given very little meat or vegetables, but many sweets and bananas. His appetite had been poor for nearly six months, during which time he had lost eight pounds. Recently it had been necessary to force him to eat. He had not vomited, but was inclined to constipation. The movements were at times greenish; at others, clay-colored. They never contained mucus. He had been very forward up to the past six months. Since then he had grown steadily weaker, so much so that he had fallen down several times on a short walk two days before. His mother said that he " seemed tired all the time," and that he did not " romp and play " as formerly. He was irritable and picked his nose a great deal. His mother, suspecting worms, had given him "True's Elixir " several times, but had never obtained any worms. He had had no serious illnesses, merely an occasional cold.

Physical Examination. He was fairly developed and nourished. His color was fair. There was no jaundice. His tongue was moist and moderately coated; the papillæ were unusually distinct. There was a tendency to keep his mouth open and a small amount of adenoids was felt with the finger. The tonsils were not enlarged. The heart and lungs were normal. The liver and spleen were not palpable. The abdomen was moderately enlarged, but lax. There were no indications of fluid and no masses were felt. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. He weighed thirty-seven pounds.

The urine was pale, acid in reaction and contained neither albumin nor sugar.

Diagnosis. Loss of appetite, progressive failure in weight and strength and irritability are symptoms common to so many diseases that they are of no special importance in diag-

nosis. The history of over-feeding with sweets and bananas and of clay-colored stools, together with the enlargement of the abdomen, when taken with these other symptoms, are, however, most characteristic of CHRONIC DUODENAL INDIGESTION and amply sufficient to justify that diagnosis. The moist coated tongue with prominent papillæ is another point in favor of this disease. The only other possibility worthy of serious consideration is chronic diffuse tuberculosis. While this might account for the general symptoms, chronic duodenal indigestion does so equally well. There are no local manifestations of tuberculosis, and several of the characteristic symptoms and signs of chronic duodenal indigestion are present. Tuberculosis can, therefore, be ruled out.

The mother's diagnosis of " worms " would not be worth mentioning if this diagnosis was not made so often, not only by mothers and grandmothers, but also by doctors who ought to know better, when children lose their appetite and are irritable, especially if they pick their noses. None of these symptoms are characteristic of the presence of worms. Picking the nose is merely a manifestation of nervousness; irritability and anorexia of a host of conditions. In fact, the author's experience leads him to believe that when children are thought to have worms they are almost invariably suffering from some other trouble and that when worms are found the children usually seem perfectly well. The absence of worms in the stools after the administration of an anthelmintic rules them out in this instance.

Prognosis. There is no danger to life except from intercurrent disease, to which the child is predisposed by his weakened condition. Recovery is likely to be slow at best and to be interrupted by relapses. How rapidly he improves depends largely on how carefully the mother follows directions. It will be two or three months, at any rate, before he is well. He is very likely to have a recurrence of his trouble unless he is very carefully fed and watched over for several years.

Treatment. The treatment is mainly dietetic. Sweets and fats must be entirely excluded from his diet for a time, and starches given only in moderation. The following diet is a reasonable one for him:

Skimmed milk.
Mutton broth.
Chicken broth.
Beef broth.
Beef juice.
White of egg.
Lamb chop.
Mutton chop.
Roast chicken.
Boiled chicken.
Roast lamb.
Roast mutton.
Beef steak.
Roast beef.
Scraped beef.
Boiled fish.
Stale bread.
Toast bread.
Whole wheat bread.
Milk toast.
Zwiebach.
Plain crackers.
Educators.
Barley jelly.
Oatmeal jelly.
Pettijohn.
Cream of wheat.
Wheat germ.
Farina.
Rice.
Baked potato.
Mashed potato.
Plain macaroni.
Peas.
String beans.
Spinach.
Asparagus.
Summer squash.
Lettuce.
Stewed celery.
Orange juice.
Junket.
Blanc mange.
Tapioca.

After he begins to improve, the amount of the starches may be increased, then yolk of egg and a little butter added, and finally whole milk substituted for skimmed milk. It is wise, however, to be very cautious about increasing the diet. Sugar, or foods containing sugar, must not be given for many months; saccharin may be used in its place if necessary. Hygienic treatment is also of importance. It is especially necessary to avoid fatigue and chilling. He should take a rest of one or two hours at noon, get up late and go to bed early, and be warmly dressed, especially about the abdomen.

Tincture of nux vomica seems to help this condition. The dose for this boy is three drops, three times a day, before meals, given in a little water, not in syrups or mixtures. He may not like it, but he can be made to take it. Phosphate of soda and cascara sagrada are the best laxatives, if any are needed.

CASE 41. John F., the third child of healthy parents, was born at full term after a normal labor, was normal at birth and weighed eight pounds and twelve ounces. He was put at once on a weak modified milk, as there was no breast milk. The milk was gradually strengthened until, when he was three and one-half weeks old, he was taking a mixture containing about 5% of fat, 3.50% of sugar and 1% of proteids. He thrived on this until he was five weeks old, when his temperature suddenly rose to 103.8° F. and his abdomen became distended. He then had a large, watery, green, foul movement and the temperature dropped to 100.8° F. He was given a half a teaspoonful of castor oil and put on barley water containing 1.50% of starch. He had several small movements like the first from the castor oil. Twenty-four hours later, as he seemed much better, his mother put him back on the milk mixture. The temperature rose again in a few hours to 103.8° F., the abdomen became distended again and he became stupid and twitchy. He was seen in consultation that evening.

Physical Examination. He was fairly developed and nourished and of fair color. The fontanelle was a little depressed. There was no rigidity of the neck. The pupils were equal and reacted to light. The mouth was dry; the tongue slightly coated. The heart and lungs were normal. The abdomen was much enlarged, tense and everywhere tympanitic. There was no localized muscular spasm. The liver and spleen were not palpable. The extremities were normal. There was considerable spasm of both arms and legs with a tendency to twitching; there was no paralysis; the knee-jerks were equal and lively; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. There was no evidence of inflammation about the navel. The rectal temperature was 103.5° F.

Diagnosis. There can be no doubt, of course, that the location of the disturbance is in the intestine. The green, foul movements, the high temperature and the evidences of toxic absorption show that there is something more than a disturbance of the equilibrium of digestion, that fermentative processes are going on in the bowel and that the condition is

bacterial in origin. The small number of movements and the absence of mucus and blood show that the intestinal wall is probably not involved. The diagnosis is, therefore, ACUTE INTESTINAL INDIGESTION OF THE FERMENTATIVE TYPE.

The stupor, the spasm of the extremities and the tendency to twitching would be considered by many to be evidences of a complicating meningitis. Meningitis is, however, a very unusual complication of the acute diarrheal diseases of infancy, while symptoms of meningeal irritation are not at all uncommon. Meningitis is, therefore, extremely improbable in this instance. The depression of the fontanelle alone is, moreover, almost sufficient to rule it out. The nervous symptoms are to be regarded, therefore, merely as evidences of toxic absorption, or possibly as effects of the high temperature.

It is possible that the excessive amount of fat in the food may have predisposed the baby to this attack by disturbing the equilibrium of the digestion.

Prognosis. The condition is a grave one because of the age of the patient, the distention of the abdomen, the high temperature and the presence of nervous symptoms. The facts that the temperature dropped and the general condition improved rapidly after he was cleaned out and the milk stopped make it probable that a repetition of the treatment will have the same result. Put in figures, the chances are probably about three to one in favor of recovery.

Treatment. The first thing to do is to empty the bowels. Castor oil is the safest and most effectual drug for this purpose. As the object of the oil is to clean out the bowels, the dose must be large enough to do it. Two teaspoonfuls is none too large, even for a baby of five weeks. In the meantime the colon should be irrigated in order to relieve the distention and empty the lower bowel. It will probably not be necessary to repeat it unless the distention recurs, because the chief seat of the trouble is in the small, not in the large, intestine.

All food must be stopped. Babies bear the withdrawal of food without much difficulty, but cannot get on without water. They must be given as much water in the twenty-four hours as they normally get in their food. This baby needs at least twenty ounces of water in the twenty-four

hours. If he will not take it from the bottle, spoon or dropper, it must be given with a stomach tube. In urgent cases it may be given by the bowel by the drop method, or subcutaneously in the form of physiological salt solution. It will probably not be necessary to have recourse to these measures in this instance. The water not only prevents the loss of fluid from the tissues, thus keeping up the equilibrium of the circulation, but favors the elimination of toxic substances through the kidneys.

The duration of the period of starvation depends on the temperature, the character of the movements and the general condition of the patient. It is impossible to state in advance how long this period will be in any individual case. In all probability, not more than twenty-four or forty-eight hours in this instance.

It is wiser, on general principles, to begin feeding with some other food than milk. This is usually some form of starch or sugar. This baby is only five weeks old and ought not to have its power of digesting starch pushed too hard. A 0.75% solution of starch in the form of barley water, with 7% of milk sugar, will be suitable to begin with.

When it is time to begin milk the best milk is human milk. Nothing else compares with it in these conditions. Next to it is modified cow's milk. In general, it is wiser to begin with some combination very low in fat. The substitution of whey for some of the feedings of barley water and sugar will be a good way to begin in this instance. The addition of a small amount of skimmed milk to the barley water and sugar mixture is another way. Another is a whey mixture low in fat and relatively high in proteids, such as fat 1%, sugar 6%, whey proteids 0.75%, casein 0.25%, without lime water.

There are no drugs which can have any effect on the local condition. No stimulants are needed at present. The castor oil and irrrigation will, in all probability, relieve the distention. The temperature is not high enough or the nervous manifestations marked enough to require special treatment. The emptying of the bowels and the water diet will diminish the toxemia, and the temperature and nervous symptoms, which are caused by it, will then gradually disappear.

CASE 42. Dana B., the second child of healthy parents, was delivered at full term by low forceps and weighed eight pounds and nine ounces. He was much asphyxiated as the result of two turns of the cord about his neck, and did not breathe well until he was two days old. He was nursed, with one feeding of a mixture containing 4% of fat, 6% of sugar and 0.50% of proteids, daily, for two weeks. During this time he did not vomit, had some colic and was slightly constipated. His weight dropped to seven pounds and two ounces. He was then weaned and given a mixture of about the same strength. He did not vomit, but had several green and curdy movements daily. Two weeks later he was changed to a mixture containing 3% of fat, 3.25% of sugar and 2.50% of proteids, which he took for a week. He did not vomit, but the movements were of the same character. The next week he had a mixture containing 4% of fat, 1.10% of sugar, 0.80% of proteids and 1.10% of starch. The story was the same as before. He was finally put on a Mellin's Food mixture containing 3.70% of fat, 4% of sugar and 1.15% of proteids, which he was taking when seen in consultation, when two months old. He took ten feedings of three ounces, giving about 150 calories and 3.2 grams of proteid per kilo. He did not vomit, but was constipated. The movements, which were yellow, contained small curds and much mucus. He was taking olive oil for the constipation. He had lost seven ounces in the last week on this mixture and weighed seven pounds and two ounces, about one and one-half pounds less than at birth. He had had no fever at any time.

Physical Examination. He was small and poorly nourished, but of fair color. The fontanelle was a little depressed. The bones of the skull did not overlap. He was bright and intelligent. His mouth was healthy, his tongue clean. There was no rosary. The heart and lungs were normal. The abdomen was a little sunken, but otherwise normal. The liver was just palpable, the spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were not obtained; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

A movement which was seen was small, loose, greenish-

yellow in color, without odor, and composed mostly of mucus, with a few small, soft, green and yellow curds.

Diagnosis. The trouble in this instance is undoubtedly digestive. The absence of vomiting and the persistence of undigested movements show that the trouble is intestinal and not gastric. The absence of fever and of signs of fermentation in the movements rule out infectious diarrhea and intestinal indigestion of the fermentative type. The diagnosis is, therefore, CHRONIC INTESTINAL INDIGESTION of the type due to disturbance of equilibrium.

The cause is, of course, to be sought in the food. He was undoubtedly underfed while on the breast. While on the bottle he was somewhat overfed most of the time. The fats were no higher than most babies can digest, but were more than he was able to handle, as is shown by the small, soft curds in the movements. It was a mistake to give olive oil for the constipation, because it increased the amount of fat to be handled when the baby was already unable to take care of that in the food. It is very probable that it also increased the tendency to constipation. The proteids were at times too low to cover the proteid need, at other times much too high. There were, however, at no time any definite signs of proteid indigestion. The sugars were usually too low, but were apparently well digested.

Prognosis. Although he has lost considerable weight, his general condition is fairly good and the movements not very bad. It ought not to be very difficult, therefore, to fit the food to his digestive capacity. It will, however, probably take a good many weeks to get him to digesting properly and gaining regularly.

Treatment. The treatment consists, of course, in regulation of the diet. The best food is human milk. It is not a necessity in this instance, however, as he will almost certainly do well on suitable modifications of cow's milk. If he does not, a wet nurse can be obtained later. The history gives two fairly definite indications as to the regulation of the diet. They are to give him less food and to cut down the fat. The calories lost by cutting down the fat can be made up, if necessary, by giving more sugar, which he is able to digest.

Whey proteids are more easily digested than casein. It will be well, therefore, to start him on a whey mixture. Lime water is contra-indicated because it throws work from the stomach on to the intestine, which is the part involved. The following mixture is a suitable one:

Fat,	2.00%
Sugar,	7.00%
Whey proteids,	0.75%
Casein,	0.25%

He should have ten feedings of two and a half ounces. This gives about 120 calories and 2.3 grams of proteid per kilo.

The constipation will probably take care of itself after regulation of the diet. If not, enemata or suppositories will be better in this instance than drugs by mouth.

CASE 43. Arthur S. was the only child of delicate and neurotic parents. There had been one miscarriage before and another since his birth. There had been no known exposure to tuberculosis. He was delivered by forceps at full term, was normal at birth and weighed eight pounds. He had whooping-cough when he was two years old and several attacks of tonsillitis during his third winter. He had an attack of otitis media when three months old and another shortly before he was seen. He had always been very nervous. His resistance was poor and he "went to pieces" on the slightest provocation. He could not play with other children without being completely upset, and was much disturbed if a visitor came to the house. He was active and played hard when allowed to do so. He was out of doors much of the time and slept out at night. He slept, however, rather poorly.

He had no disturbance of the digestion until the previous August, when he had an attack of diarrhea and vomiting, lasting two weeks. He had had repeated attacks of diarrhea, lasting several days, every one to three weeks since then. His appetite was poor during the attacks and he had considerable gas and pain in the abdomen. There was, however, no nausea, vomiting or fever. The stools were of good color, but loose, foul and undigested. He lost weight rapidly during the attacks and hardly got it back after one attack before he had another. His mother thought that his attacks were in some way connected with his food and that some of them were caused by potato and green vegetables. She was not, however, very certain of these points, and had not noticed whether the attacks were connected with overfatigue or excitement. His diet was a very good one. He was seen early in January, when four years old.

Physical Examination. He was fairly developed and nourished and of good color. He looked delicate, however, and appeared nervous and excitable. His tongue was nearly clean, his throat normal. The heart and lungs were normal. The level of the abdomen was that of the thorax. Nothing abnormal was detected in it. The liver and spleen were not palpable. The extremities were normal. There was no

spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. He was about two inches taller than the average child of his age, but weighed about two pounds less. His weight without clothes was thirty-seven and one-quarter pounds.

Diagnosis. The diagnosis of CHRONIC INTESTINAL INDIGESTION, with recurrent exacerbations, is very evident. This diagnosis is, however, not sufficient. It is necessary, in order to treat the condition satisfactorily, to find out which of the food elements he can digest and which he can not. His mother was told, therefore, to feed him as she had been doing, to keep a careful record of exactly what he ate, and to bring in his stools and urine for examination. He took 23.3 grams of fat, 106 grams of carbohydrates and 75 grams of proteid, having a caloric value of 958, which is equal to 56 calories per kilo and amply covers the proteid need. He had considerable gas and two stools during the twenty-four hours. The stools were large and had the consistency and appearance of pea soup. The reaction was highly acid and the odor acid. They gave a marked macroscopic reaction for starch with the iodine test. Microscopically there were many starch granules and iodophilic organisms, both cocci and bacilli. There was no undigested fat or muscle fibre. The urine contained no albumin or sugar and showed no reaction with Millon's reagent. It is evident, therefore, that the disturbance in this instance is due to the fermentation of the carbohydrates. The final diagnosis is, therefore, chronic intestinal indigestion with intolerance of carbohydrates.

Prognosis. He will undoubtedly eventually recover. It will, however, take a number of months, and perhaps several years, of the most careful treatment to bring this about. Recovery will certainly be slow and interrupted by many relapses.

Treatment. The treatment consists in adapting his diet to his digestive capacity. He is unable to digest carbohydrates. They must, therefore, be diminished and the caloric value of his food kept up by the substitution of fats and proteids for them. It is impossible to know in advance how

much carbohydrates he can take. He is unable to take 106 grams without marked disturbance of the digestion. It will be well, therefore, to cut the amount of carbohydrates down to 60 grams. If he is unable to utilize this amount, it will have to be diminished. If he is able to utilize it, it may be gradually increased. It is important to give him part of his food in the form of milk. A quart of milk contains 43 grams of carbohydrates. This allows only 17 grams in all the rest of his food. It will be wiser, therefore, in the twenty-four hours, to give him only one and one-half pints of milk which contains 32 grams of carbohydrates and allows 28 grams for the rest of his diet. It is important, in order to satisfy his appetite, not to give these carbohydrates in too concentrated a form, because, if they are, he will feel that he is not getting enough to eat. Two slices of bread, for example, in the whole day would more than cover his allowance, but would not in any way satisfy him. If, however, he is given three tablespoonfuls of cereal containing 16.5 grams, 1 tablespoonful of macaroni containing 5 grams, and one-half of a slice of bread containing 7.5 grams of carbohydrates, he will get a much greater variety and a much greater bulk of food, and still not get but 29 grams of carbohydrates. The caloric value of one and one-half pints of milk, 3 tablespoonfuls of cereal, one tablespoonful of macaroni and one-half of a slice of bread is 644. The average child of his age requires about 1125 calories. It will probably be possible to satisfy him for the present with 1000 calories per day. An egg containing 72 calories, an ounce of meat containing 60 calories, and an ounce of butter containing 225 calories, will just make up the required amount. If preferred, cream can be substituted for part of the milk and the butter diminished.

It will be well to cut out green vegetables and potatoes from his diet in the beginning, because his mother thinks that they may have been the cause of several of his attacks in the past. It will probably be possible to give the vegetables, if not the potato, a little later. The following list will be a suitable one for him at present. Saccharin may be used in place of sugar, if necessary.

Milk.	Boiled mutton.	Cream of wheat.
Cream.	Roast beef.	Wheat germ.
Mutton broth.	Roast chicken.	Germea.
Chicken broth.	Boiled chicken.	Ralston.
Bouillon.	Broiled chicken.	Farina.
Soft boiled eggs.	Minced meat.	Rice.
Dropped eggs.	Boiled fish.	Plain macaroni.
Scrambled eggs.	Broiled fish.	Plain spaghetti.
Lamb chop.	White bread.	Butter.
Mutton chop.	French bread.	Cream cheese.
Beef steak.	Plain crackers.	Junket.
Roast lamb.	Plain educators.	Baked custard.
Roast mutton.	Milk toast.	Plain blanc mange.

There is no indication for drugs. He must, however, be carefully guarded against fatigue and excitement.

CASE 44. Eleanor S., five and one-half years old, was the only child of healthy parents. There had been no deaths or miscarriages and no known exposure to tuberculosis. She was perfectly well until she was one and one-half years old, since when she had had repeated attacks of indigestion. She had, however, been better than usual during the year preceding the present attack, which had begun two months before. She had been having three or four undigested stools daily and had occasionally vomited. Her diet had been cut down without much effect on the symptoms. Her appetite was poor, she had a little fever most of the time, had lost at least five pounds in weight and much strength and color.

Physical Examination. She was small, thin and pale, but unusually intelligent. Her tongue was clean and her throat normal. The heart and lungs were normal. The abdomen was much enlarged, the circumference of the chest at the nipples being 47 cm., while the greatest circumference of the abdomen was 52½ cm., and that at the navel, 48 cm. It was everywhere tympanitic. No masses were felt and there were no evidences of fluid. The liver and spleen were not palpable. The kidneys were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. The peripheral lymph nodes were not palpable. The rectal temperature was 100° F. Her weight, with her clothes, was 27 pounds (the average is 39.6 pounds), and her height, without her shoes, 36¾ inches (the average is 41.3 inches).

Diagnosis. The diagnosis of CHRONIC INTESTINAL INDIGESTION is self-evident. This diagnosis is, however, not sufficient. It is necessary, in order to treat the condition satisfactorily, to find out which of the food elements she can digest and which she cannot. Her mother was told, therefore, to feed her as she had been doing, to keep a careful record of exactly what she ate and to bring in her stools and urine for examination. She took 30 grams of fat, 100 grams of carbohydrates and 24 grams of proteid in the twenty-four hours, having a caloric value of 787. She had three stools which were soft, cream-colored, smooth, except for the presence of vegetable chaff, foul in odor and alkaline in reaction. Microscopically they contained a large amount

of soap and fatty acid splinters, but no starch, muscle fibres or mucus. The urine contained no albumin or sugar, but showed a very marked positive reaction with Millon's reagent. The soap and fatty acid crystals in the stools show that she is unable to take care of even 30 grams of fat in the twenty-four hours, which is far less than the average fat capacity at this age, while the foul odor of the stools and the positive reaction with Millon's reagent show that there is putrefaction of the proteids. The final diagnosis is, therefore, chronic intestinal indigestion with marked intolerance of fat and diminished tolerance of proteids.

Prognosis. She will probably eventually recover. It will, however, take a number of years of the most careful treatment to bring this about. She will, moreover, almost certainly always be small.

Treatment. The treatment consists in adapting her diet to her digestive capacity. The fats must be eliminated as far as possible and the proteids reduced to approximately the amount necessary to cover her proteid need. Milk proteids are the best, because the products of the decomposition of the proteids of milk are somewhat less toxic than those of the proteids of meat and eggs. The lactic acid forming organisms have an inhibitory action on the proteolytic bacteria. They should be given, therefore, to diminish the decomposition of the proteids. They are best administered in the form of buttermilk. A quart of buttermilk contains 35 grams of milk proteids, which is equal to about 3 grams of proteid per kilo of her weight, an amount amply sufficient to cover her proteid need. It contains about 5 grams of fat and provides 360 calories. The average caloric need at her age is 1200. She is so small, however, that she does not require as many calories as the average child of her age. Her caloric need, reckoned at 70 calories per kilo, is only 800. It will be well, however, on account of her small size and emaciation, to give her, if possible, 1000 calories daily. The additional calories must be given in the form of carbohydrates. One ounce of crackers, two slices of bread, a potato the size of an egg, four tablespoonfuls of cereal, four teaspoonfuls of sugar and the juice of an orange will, for example,

provide 620 calories and bring the total number of calories up to 980. (See Table of Food Values, page 449.) They will add only 4 grams of fat and but little proteid. It is, of course, not necessary to give the same carbohydrate foods every day; in fact, she will tire of her diet much less quickly, if they are varied from day to day. The following carbohydrate foods are suitable for her:

White bread.
French bread.
Whole wheat bread.
Plain crackers.
Educators.
Oatmeal.
Cream of wheat.
Wheat germ.
Germea.
Ralston.
Farina.
Rice.
Hominy.
Cracked wheat.
Shredded wheat biscuit.
Baked potato.
Mashed potato.
Boiled potato.
Stewed potato.
Plain macaroni.
Plain spaghetti.
Tapioca.
Sago.
Orange juice.
Grapes.
Sugar.

It will probably be possible, a little later, when the proteid putrefaction has been overcome by the lactic acid bacilli and the excess of carbohydrates, to add broths, clear soups, white of egg and lean meat to her diet. It will also be well, in order to increase the variety of her food, to substitute skimmed milk for a part of the buttermilk. Still later, strained green vegetables and a little fruit may also be added. A reasonable diet for her will then be as follows:

Buttermilk.
Skimmed milk.
Mutton broth.
Chicken broth.
Bouillon.
White of egg.
Lamb chop.
Mutton chop.
Beef steak.
Roast lamb.
Roast mutton.
Boiled mutton.
Roast beef.
Roast chicken.
Boiled chicken.
Broiled chicken.
White bread.
French bread.
Whole wheat bread.
Plain crackers.
Educators.
Milk toast.
Oatmeal.
Cream of wheat.
Wheat germ.
Germea.
Ralston.
Farina.
Rice.
Hominy.
Cracked wheat.
Shredded wheat biscuit.
Baked potato.
Mashed potato.
Boiled potato.
Stewed potato.
Plain macaroni.
Plain spaghetti.
Strained string beans.
Strained spinach.
Strained peas.
Asparagus.
Stewed celery.
Baked apples.
Stewed prune pulp.
Grapes.
Orange juice.
Junket.
Corn starch pudding.
Tapioca.
Sago.
Plain blanc mange.

There is little to be hoped from drugs in this instance. There is no indication for hydrochloric acid and pepsin, because the gastric digestion is but little impaired. Pancreatin will be destroyed in the stomach and can, therefore, do no good. It will be well, however, to give her five drops of the tincture of nux vomica, in a teaspoonful or more of water, three times a day, before meals, to stimulate her appetite. All forms of oil are, of course, contraindicated.

CASE 45. Ernest B. was the third child of healthy parents. He was born at full term, October 11, after a normal labor, was normal at birth and weighed eleven and one-quarter pounds. His mother had an abundance of milk and was better in health than she had ever been. He nursed well and did not vomit, but cried a great deal and had many loose, green stools, containing fine curds and a little mucus. The milk was analyzed October 23 and found to contain 2.75% of fat, 5.05% of sugar and 3.94% of proteids. The attending physician got the mother out of bed when the baby was two weeks old and out of doors when he was four weeks old with the hope of reducing the proteids in the milk by exercise. The baby, nevertheless, continued to cry almost constantly and to have eight or ten movements, of the same character, daily. He did not vomit, however, and gained steadily in weight. When seen November 29, at the age of seven weeks, he weighed thirteen pounds and ten ounces, having gained ten ounces in the last week. He was getting seven feedings in the twenty-four hours, the intervals between the nursings being three hours during the day and four and one-half hours at night. He had been weighed before and after nursing for several days and found to get about twenty-eight ounces of milk during the twenty-four hours. His mother felt unusually well in every way and was not worried or nervous. She did not take care of the baby and was, therefore, not disturbed by the crying. She was taking very little exercise, however, and was not out of doors more than one or two hours a day. Another analysis of the milk was made the day that he was seen and it then contained 2.65% of fat, 5.95% of sugar and 2.93% of proteids.

Physical Examination. He was well developed and nourished and of good color. The posterior fontanelle was closed. There was no rosary. The heart, lungs and abdomen were normal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities and external genitals were normal. There was no irritation of the buttocks. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

The stools were small, very loose, green, slightly acid in reaction and contained a few small, soft curds and a little mucus, but were not frothy.

Diagnosis. He has, without question, a disturbance of the intestinal digestion. This must be connected in some way with the breast-milk. It cannot be due to an excess of milk, because twenty-eight ounces of this milk will not give him more than 90 calories per kilo. It must be due, therefore, to something in the composition of the milk. It cannot be due to the fat, because the percentage of fat is somewhat low and the stools show no evidences of fat indigestion beyond a few small curds. It certainly is not caused by the sugar, because the percentage of sugar in the milk is within the normal limits, there is no irritation of the buttocks, the acidity of the stools is slight and they are not frothy. It is evident, by exclusion, therefore, that it must be due to the proteids. This conclusion is corroborated by the high percentage of the proteids and by the symptoms, which are those characteristic of an excess of proteids in breast-milk. The diagnosis is, therefore, INTESTINAL INDIGESTION FROM AN EXCESS OF PROTEIDS IN THE BREAST-MILK.

Prognosis. The percentage of proteids in the milk has dropped from 3.94 to 2.93 since the mother has been out of bed, although she has taken but little exercise and has been out of doors but little. She is well and is not nervous or worried. The excessive amount of proteids is undoubtedly due, therefore, to lack of exercise. It is possible for her to get it. If she does, the percentage of proteids will rapidly fall to normal and the symptoms of indigestion cease.

Treatment. Exercise diminishes the amount of proteids in the milk, if they are excessive. If the exercise is carried to the point of fatigue, however, they increase again. The treatment in this instance consists, therefore, entirely in regulation of the mother's exercise. She must exercise out of doors until she is comfortably tired, but not fatigued. Walking is the best form of exercise for her at this time of year. There is no reason why she should not eat a general diet and lead an ordinary life in every way.

CASE 46. Sally B., three and one-half months old, was born at full term after a normal labor and weighed six and one-fourth pounds. She was breast-fed for ten days, when the milk gave out and she was put on modified milk. She got on very well indeed until she was two months old, when she weighed nine pounds. She then had a severe attack of influenza and was very ill for about two weeks. During her illness she lost some weight and was left much depressed generally. She had finally begun to digest well again and had a little more than regained her weight. She was taking eight feedings of three ounces of a mixture, prepared at a laboratory, supposed to contain 2.50% of fat, 5.50% of sugar, 0.50% of whey proteids and 0.25% of casein, with lime water 10% of the total quantity. It was winter and the mixture was pasteurized at 155° F.

Without any known cause she began to vomit and to have much gas and discomfort. The vomitus smelled sour. She also began to have watery, light-green movements of a sour odor, which did not contain curds or mucus, and which irritated the buttocks. She had no fever.

Physical Examination. She was fairly developed and nourished. There was moderate pallor. The anterior fontanelle was 3 cm. in diameter and slightly depressed. The tongue was slightly reddened. There was no rosary. The heart and lungs were normal. The abdomen was slightly distended, but otherwise normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. The rectal temperature was 98° F. The stools were as described above.

Diagnosis. The negative physical examination and normal temperature rule out everything outside of the digestive tract. The absence of fever, the time of year and the pasteurization of the food make a bacterial infection very improbable. The cause of the trouble must, therefore, be sought in the food. The combination of sour vomiting, flatulence and watery, green, sour, irritating stools points strongly to trouble in the digestion of the sugar. This hardly seems rea-

sonable, however, in a baby that had for months been taking from five per cent to seven per cent of milk sugar without trouble. Analysis of the food by a competent chemist showed, however, that it contained nearly ten per cent of sugar. The fat and proteid contents were reasonably accurate. The diagnosis, therefore, is ACUTE GASTRIC AND INTESTINAL INDIGESTION from an excessive amount of sugar.

Prognosis. The prognosis is good, as the cause of the trouble can easily be remedied.

Treatment. The treatment is, of course, the correction of the mistake in the preparation of the food. As this mixture gives but 86 calories and 1.3 grams of proteid per kilo, it will also be well to increase the percentage of the proteids a little.

CASE 47. Mary S., six months old, was the fourth child of healthy parents. There had been no known exposure to tuberculosis. She was born at full term after a normal labor, was normal at birth and weighed five and one-half pounds.

She was started at first on a weak mixture, copied from Dr. Holt's little book, " The Care and Feeding of Children," and did very well for a time. The gain in weight was, however, very slow, and she did not reach eight pounds until she was five months old. She had lost half a pound since then. Because of the slow gain in weight, the physician in charge rapidly strengthened the formulæ, but apparently never inquired into the details of the preparation of the food. The parents, being even more anxious than the physician to have the baby gain in weight, used gravity cream from Jersey milk instead of the 10% top milk specified in the book, and finally bought thick, pasteurized cream from a dealer. Her appetite became very poor. When she came to me, when six months old, her mother was attempting to give her eight feedings of four ounces at two and one-half hour intervals. She seldom took more than twenty ounces in the twenty-four hours, however, and this only after much urging, two and a half hours often being needed to get in two and one-half ounces. She seldom seemed hungry, but, if she did, was always satisfied with an ounce. She never vomited unless the food was forced too much. She occasionally had a little colic but always had a good deal of rumbling in the abdomen and passed much gas from the bowels. The bowels were usually constipated. The movements were small, crumbly, very light yellow, apparently well digested and without much odor. She was taking the following mixture:

Pasteurized rich cream,	5½ ounces.
Whole milk (Jersey),	2½ ounces.
Lime water,	1½ ounces.
Water,	18½ ounces.
Milk sugar,	1 dessertspoonful.

Physical Examination. She was small and thin and moderately pale. She was feeble but intelligent. The veins on the scalp were prominent. The anterior fontanelle was 3 cm. in diameter and level. The posterior fontanelle was still open.

There was no craniotabes. The throat was normal; the tongue somewhat reddened. There were no teeth. There was a marked rosary. The heart and lungs were normal. The abdomen was large, but lax. There was no dullness and no tumor was made out. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. Her weight was seven and one-half pounds.

Diagnosis. The physical examination justifies nothing more than the diagnosis of malnutrition with a slight and unimportant amount of rickets. The cause of the malnutrition must be sought in the history. The satiation after taking a small amount of food, taken in connection with the lack of marked symptoms of indigestion and the slow gain, suggest at once too rich a food. The small size, crumbly character and light-yellow color of the stools are very characteristic and show that they contain fat in the form of soap. The story of the substitution of gravity cream from Jersey cows for 10% top milk from ordinary cows, and later of rich bottled cream for the gravity cream, corroborates, of course, the assumption that the food was too rich in fat. It shows also how necessary it is for the physician to know exactly how the food which he orders is prepared.

The mixture which the baby was taking, if made of 10% cream and whole milk from Holstein or Ayreshire cows, as it was supposed to be, would contain about 2.40% of fat, 3.25% of sugar and 0.90% of proteids, a weak food for the age. If made of gravity cream from average milk it would have contained about 3.40% of fat. The modified milk in the bottle, however, looked like cream, and when examined was found to contain 8.8% of fat.

The diagnosis is, therefore, INDIGESTION (chiefly intestinal), malnutrition and rickets FROM AN EXCESS OF FAT IN THE FOOD. The author wishes to call particular attention to the fact that in this instance, as in almost all others of disturbed nutrition or digestion from an excess of fat in the food, the

excess was a gross one, the amount being far beyond the normal top limit of 4%.

Prognosis. The prognosis is good on a reasonable diet. The gain in weight will probably be slow, and it will be a long time before the baby will be able to take as high a percentage of fat as the average baby, as it is always difficult to develop the ability to digest fat again when it has once been seriously impaired.

Treatment. The treatment is entirely by regulation of the diet. Human milk would be the best food and would almost certainly agree, in spite of its comparatively high fat content. Next to this is some modification of cow's milk. The milk should come from Ayreshire or Holstein cows. The percentage of fat should be low because of the impaired power of digestion of fat. The caloric value can be made up by higher percentages of sugar and proteids. There is no indication for the addition of an alkali. Three ounces is as much as she ought to be expected to take at a feeding. Eight feedings, at two and a half hour intervals, will be sufficient. The following formula is a suitable one:

Fat,	2.50%
Sugar,	5.00%
Proteids,	1.25%

This gives 100 calories and 2.6 grams of proteid per kilo.

The baby should not be fed at other than the regular intervals and, if she does not take the food willingly, the attempt to make her take it should not be prolonged over half an hour. If the constipation persists it may be treated by enemata of suds or sweet oil, or by suppositories of soap, glycerin or gluten, but not by sweet oil by the mouth.

CASE 48. John B., the fifth child of healthy parents, was born at full term after a normal labor. He was normal at birth and weighed eight and three-fourths pounds. He was not nursed, but was started at once on a modified milk containing 2.50% of fat, 5.50% of sugar, 0.80% of proteids, with lime water 5% of the total quantity. He did not thrive on this and was soon put on a mixture containing 3.40% of fat, 6.50% of sugar, 1.50% of proteids and 0.75% of starch. The lime water was still 5% of the total quantity. He took this well, but was not satisfied. He did not vomit, but was constipated. The movements contained many large, tough curds, but were of good color and did not contain mucus. When four weeks old he was changed to a pancreatized mixture containing 3% of fat, 3.50% of sugar and 2% of proteids. When seen, at five months, he was still taking this mixture, getting six or seven feedings of four ounces at three-hour intervals. Seven feedings of four ounces of this mixture gives 106 calories and 4.2 grams of proteid per kilo. He was also taking two teaspoonfuls of olive oil daily. He did not vomit, but had considerable gas. The bowels did not move without laxatives. The movements were light green or yellow in color and always contained large, hard curds, but no mucus. He did not gain in weight.

Physical Examination. He was bright and happy. He was small and thin and his color was fair. The fontanelle was 3 cm. in diameter and level. The bones of the skull did not overlap. The tongue was slightly reddened; the mouth and throat were otherwise normal. There was no rosary. The heart and lungs were normal. The level of the abdomen was slightly below that of the thorax; nothing abnormal was detected in it. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. His weight was eight pounds and thirteen ounces.

Diagnosis. The physical examination justifies nothing more than a diagnosis of malnutrition. The slight reddening of the tongue is probably merely the result of local irritation

from the nipple, but may be a manifestation of gastric indigestion. The large, hard curds in the movements show that the casein is not properly digested. The amount of proteid in the food, 4.2 grams of proteid per kilo, is, moreover, excessive. There is nothing about the movements to show any disturbance of the digestion of either fat or sugar. The absence of vomiting, combined with the constipation and the flatulence, point to intestinal indigestion rather than to gastric. The failure to gain and the constipation suggest an insufficient supply of food. One hundred and six calories per kilo ought, theoretically, to be enough, but probably is not, as the caloric needs presumably depend somewhat on the age as well as on the weight. That is, a well baby of five months needs more calories per kilo than a fat baby of the same weight of one month. The diagnosis of malnutrition from an insufficient supply of food, and mild INTESTINAL INDIGESTION FROM AN EXCESS OF PROTEIDS IN THE FOOD is, therefore, justified.

Prognosis. The cheerfulness and the absence of marked signs of wasting show that the disturbance of nutrition is not a severe one. The disturbance of digestion is only in that of the proteids. These can be easily considerably lowered and still cover the proteid needs, while the fat and sugar can be increased to cover the caloric needs. The prognosis is, therefore, good.

Treatment. The treatment is, of course, entirely by regulation of the diet and not by the administration of drugs. Human milk, as in all the chronic disturbances of digestion or of malnutrition in infancy, is the best food. In this instance, however, it does not seem a necessity.

The caloric value of the food can best be increased by raising the percentage of sugar to 7, as the sugar is at present altogether too low. There is also no objection to giving five ounces at a feeding. After this is done it will not be necessary to increase the percentage of the fat, which is now a reasonable one. The percentage of proteids should be lowered somewhat, as the excessive amount is throwing unnecessary work on the eliminative organs, and they are not needed to keep up the caloric value of the food, which can be supplied

by the fat and sugar, which are digested. A considerable proportion of the proteids should be given in the form of whey proteids, as the large curds show that it is the casein which is not digested. An alkali is not indicated, as there is no vomiting. The following formula meets these indications:

Fat,	3.00%
Sugar,	7.00%
Whey proteids,	0.75%
Casein,	0.25%

Seven feedings of five ounces of this mixture give 159 calories and 2.6 grams of proteid per kilo.

Another method of rendering the casein more digestible is by the addition of starch to the food, which by its mechanical action prevents the formation of large curds; 0.75% of starch has as much effect as larger amounts. There is no objection to giving this amount of starch because, while it is true that the amylolytic function is only partially developed at this age, it is practically always sufficiently developed to take care of this or even somewhat larger amounts of starch without difficulty. This action of starch is, however, rather unreliable. Peptonization, or, as it should be called, pancreatization, of the food, if properly done, also usually prevents the formation of large curds. If not properly done, as was probably the case in this instance, it is ineffective.

The reddened tongue requires no treatment. Change of nipples and regulation of the diet will correct it.

The bowels may be moved, if necessary, by enemata of suds or sweet oil, suppositories of soap, gluten or glycerin, or by milk of magnesia, in doses of from one-half to one teaspoonful, once or twice daily.

CASE 49. Catherine L., six and one-half years old, was the first child of healthy parents. She was born about a month premature and for the first year had a feeble digestion and was very difficult to feed. During the first two years of her life she had repeated attacks of vomiting, some of which resembled the recurrent vomiting seen in older children. After this, however, these attacks ceased, although her diet always had to be very carefully regulated. There was always a tendency to constipation and to duodenal indigestion. She had never had any severe attacks of duodenal indigestion, however, as they could always be aborted by care in the diet and early treatment. During the last year her digestion had been much stronger than ever before. Early in June she had an attack of what was supposed to be duodenal indigestion. Recovery from this was rapid, however, and she had been perfectly well until August 21. That afternoon she went to a children's party and was a good deal excited. The food at the party was very simple and she did not over-eat. She began to vomit during the night. The vomitus contained a great deal of bile. The morning of the 22d her temperature was about 100° F. She continued to vomit bile during the day and night of the 22d, and also a little in the morning of the 23d. The vomitus continued to contain much bile. The temperature during the 22d and the morning of the 23d ranged between 100° F. and 101° F. Examination of the abdomen during the 22d showed nothing whatever abnormal. In the early morning of the 23d there was a little tenderness in the right iliac fossa, with a suggestion of spasm. There was and had been no pain in the abdomen. The bowels had been moved freely by enemata during the 22d. About noon of the 23d she had a chill and the temperature rose to 104° F., but soon began to drop again. At that time there was no pain in the abdomen, but muscular spasm and tenderness in the right iliac fossa were rather more marked. The blood count at that time showed 26,200 leucocytes.

She was then given a dose of castor oil, which during the afternoon produced a movement containing more or less mucus. She was seen in consultation at 5 P.M. on the 23d.

Physical Examination. Her face looked a little pinched,

but she was bright and happy. She was not vomiting and had no pain whatever. The pupils were equal and reacted to light and accommodation. There was no rigidity of the neck. The ears were normal. The heart and lungs showed nothing abnormal. The level of the abdomen was considerably below that of the thorax. When very deep pressure was made in the right iliac fossa she said that it hurt her a little, but gave no evidence of pain unless questioned. In fact, she smiled and talked while the abdomen was being examined. There was also very slight muscular spasm in the right iliac fossa. No tumor could be felt and there was no dullness. The abdomen was otherwise negative. The liver and spleen were not palpable or enlarged to percussion. The extremities showed nothing abnormal. There was no Kernig's sign. The knee-jerks were equal and lively. The temperature in the mouth was 101° F., and the pulse 120.

Diagnosis. The diagnosis in this case lies between tubercular meningitis, acute duodenal indigestion and appendicitis.

Tubercular meningitis should be thought of in this instance as in every illness in a child beginning with vomiting. It can be ruled out at once, however, on the absence of all signs of meningeal irritation and the presence of signs of trouble in the abdomen. The white count is also against tubercular meningitis, but does not rule it out, as there may be a leucocytosis in tubercular meningitis.

The points in favor of acute duodenal indigestion are the previous history of attacks of duodenal indigestion and of feeble digestion in the past, the typical onset of the attack with vomiting of bile, the low temperature and the slightness of the physical signs of appendicitis. The points in favor of appendicitis are the persistence of the symptoms after proper treatment for duodenal indigestion, the pinched face, the chill, the leucocytosis and the physical signs, namely, localized muscular spasm in the right lower abdomen and the slight tenderness in this region on deep pressure. The persistence of the symptoms in spite of treatment is merely suggestive of appendicitis and not inconsistent with duodenal indigestion. The chill is very suggestive of appendicitis, but chills do sometimes occur in duodenal indigestion. A leucocytosis as

high as 26,200 practically never occurs in duodenal indigestion at this age, and in connection with the chill and the physical signs is extremely important in the diagnosis. The localized muscular spasm is almost pathognomonic of appendicitis when taken in connection with the other symptoms and signs. The deep tenderness is corroborative evidence of that furnished by the muscular spasm. It might be thought that the physical signs were too indefinite to be of much importance. This is not so, however, as indefiniteness of the physical signs is characteristic of appendicitis in childhood. Finally, the previous attacks which were called duodenal indigestion may equally well have been recurrent attacks of appendicitis. The diagnosis of APPENDICITIS, therefore, seems positive.

The condition of the appendix is always problematical. In this instance it is justifiable to conclude from the good general condition, the high white count and the mildness of the physical signs that perforation has certainly not occurred and that in all probability there is but little extension of the inflammation outside of the appendix. The appendix, however, may very possibly be ulcerated and ready to perforate.

Prognosis and Treatment. The prognosis is always more uncertain in childhood than in later life because of the greater difficulty in determining the exact condition of the appendix before operation. There is no question but that an immediate operation should be done in this instance. She is in good condition to bear an operation and, since it is impossible to find out the exact condition of the appendix, it is far wiser to operate at once than to run the risk of extension of the inflammation or perforation. The prognosis with immediate operation is very good because the appendix has almost certainly not perforated and there is probably but little inflammation about it.

CASE 50. Ethel H., four years old, was the extremely nervous child of nervous parents. She had always been well except for measles and chicken-pox. She vomited a little the morning of August 6, but seemed well in every way the next day. The following day, which was extremely hot, she went to Revere Beach and ate a considerable amount of ice cream. She slept fairly well that night, but on the morning of the 9th vomited once and began to complain of pain about the navel. A physician, who was called, found the temperature 102° F. The respiration was rapid, but the lungs were normal. He gave two teaspoonfuls of castor oil and stopped all food. She had three or four loose, foul movements, which contained a little mucus, but no blood, as the result of the castor oil. The abdominal pain continued and was very severe. The temperature the morning of the 10th was 103.5° F. The bowels moved three times during that day, the movements being of the same character. The abdominal pain continued. The evening temperature was 101° F. The pulse ranged between 145 and 160, and the respiration between 40 and 80. There was no cough and the lungs remained normal. She vomited several times that night and, on account of the severe pain in the abdomen, slept but little. The temperature by rectum the morning of the 11th was 99.6° F., the pulse 140. She took no food, but drank considerable water. She vomited several times that morning. She had had a little brandy, some bismuth and chalk mixture and two doses of Castoria. She was very restless and complained constantly of pain in the abdomen. The abdomen was distended and tender from the first, the physician thought less so that morning. The physician had felt that the pain was exaggerated because of the nervous temperament of the child. She was seen in consultation at noon, August 11.

Physical Examination. She was well-developed and fairly nourished. There was moderate pallor. She was very restless, tossing from side to side and constantly crying out from pain in the abdomen. She lay on her back with the legs flexed on the abdomen; extending them caused pain. Her face looked pinched. The tongue was dry, but not coated. The heart and lungs were normal. The abdomen was only

moderately enlarged, but very tense. No localized spasm could be made out. She complained whenever the abdomen was touched, but no more so on deep than on light pressure. There was no localized tenderness. There were no signs of fluid in the abdomen. The liver and spleen were not palpable. Rectal examination showed nothing abnormal, but caused much pain. The extremities were normal. There was no spasm or paralysis. The knee-jerks and Kernig's sign could not be obtained because of the child's resistance. The rectal temperature was 101° F.; the pulse, 156. A movement, passed during the examination, consisted of a few small masses of brownish mucus.

Diagnosis. Pneumonia is suggested by the sudden onset and the comparatively greater rise in the rate of the respiration over that of the pulse. The location of the pain in the abdomen is not against pneumonia, because the pain in pneumonia in childhood is often localized in the abdomen. The abdomen is also often tense in the early stages of pneumonia in childhood. The drop in the temperature without a corresponding diminution in the rate of the respiration, the absence of cough, grunting respiration and movement of the alæ nasi, the absence of physical signs in the lungs and the pinched face are together sufficient to exclude pneumonia.

The free movements of the bowels are sufficient to rule out intestinal obstruction.

The diagnosis lies, therefore, between intestinal toxemia and appendicitis. The history of eating ice cream on a hot day is suggestive of intestinal toxemia, but is not inconsistent with appendicitis. The continuance of the symptoms in spite of catharsis and starvation is against toxemia, but does not exclude it. The character of the stools is much against toxemia. The vomiting is consistent with either condition and hence is of no importance in the differential diagnosis. Distention of the abdomen is, however, unusual in toxemia, and tenderness and pain extremely rare. These two points are sufficient in themselves to turn the scale in favor of appendicitis.

The general abdominal distention accounts for the lack of localized spasm and tenderness and suggests a beginning or

developing general peritonitis. The drop in the temperature with no improvement in the other symptoms is strong evidence that perforation has occurred and peritonitis begun. The diagnosis is, therefore, APPENDICITIS with probable perforation and beginning peritonitis.

An examination of the blood was not made in this instance and would not have helped, because a high white count is consistent with either condition. Moreover, a low white count is consistent with either depression after perforation or intense toxemia.

Prognosis and Treatment. The prognosis in this instance is practically hopeless. The only chance lies in immediate operation.

CASE 51. Nathaniel C., three years old, had always been very well and strong. There had been no indiscretion in diet. The milk supply was supposedly above reproach; his surroundings were ideal. He complained of indefinite pains in the legs and abdomen during the day of November 19, but was up and dressed. His nurse gave him some castor oil in the morning. When seen by his physician at 3 P.M. the physical examination was entirely negative; the temperature, 100.5° F. He began to have loose movements during the night, which were not carefully observed. The morning of the 20th the movements were very foul and began to contain slight streaks of blood. He did not seem really sick. The rectal temperature was 99° F. He had six movements containing blood and mucus during the day of the 20th. Part of them were foul, the others were not. He was given bismuth during the day and his bowels were irrigated in the evening. He had six more movements of the same character during the night. He had eight similar movements during the day, which were preceded and followed by pain. He had been nauseated for the first time during the afternoon, but had not vomited. He had had nothing but water during the day, but had taken a mixture of bismuth and salol with ten drops of paregoric every two hours. He was seen in consultation at 7 P.M., November 21.

Physical Examination. He was well developed and nourished and of good color. He was perfectly intelligent. The tongue was moist and but slightly coated. The heart and lungs were normal. The abdomen was sunken and negative, except that he complained of slight pain on deep pressure in the left lower quadrant. Nothing else abnormal was made out. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign and the neck sign were absent. There was no enlargement of the peripheral lymph nodes. Rectal examination showed nothing abnormal. The rectal temperature was 100° F.; the pulse, 100.

The movements were small and composed almost entirely of green mucus and blood.

Diagnosis. The continued moderate temperature and the

small movements of mucus and blood associated with pain are so charactertisic of INFECTIOUS DIARRHEA of the dysenteric type that no differential diagnosis from the other forms of diarrhea is necessary. The only other possibility, intussusception, can be ruled out on the slow onset, the absence of vomiting and the negative abdominal and rectal examinations.

Prognosis. Infectious diarrhea of this type is always a serious disease. The patient is not out of danger until he is well. It is impossible to say so early in the disease as this what course it may take. The relatively low temperature, the comparatively small number of movements, the absence of vomiting, the nearly clean tongue and the good general condition make the prognosis in this instance comparatively good. The chances at present seem to be about three out of five in favor of recovery.

Treatment. It is doubtful if he has been thoroughly cleaned out. A tablespoonful of castor oil is, therefore, indicated. It will probably be wiser to continue the starvation for twenty-four hours longer. He must, however, have a sufficient supply of water. This is, for a boy of his age, about a quart in twenty-four hours. If he will not take it by mouth, it may be given high in the bowel by the drop method. His condition at present is hardly serious enough to warrant the use of salt solution subcutaneously. It will probably be wise to begin nourishment after twenty-four hours. Milk in any form is contra-indicated. Starches, such as barley, arrowroot or rice, in the form of waters or jellies, either with or without milk sugar or malt sugar to increase their nutritive value, will be best borne. If he will not take starches in this form there is no objection to giving them in the form of crackers, zwiebach or toast. Weak mutton or chicken broth may be given, not as foods (because they are practically without nutritive value), but to induce him to take the starchy foods and as a means of introducing water. Beef juice is contra-indicated because it is so prone to decomposition by the intestinal bacteria. Albumen water is likely to produce urticaria and has but little nutritive value, the white of an egg containing but twelve calories. A few ounces of albumin water, made as it usually is with the white of one egg to eight ounces of water,

has, therefore, practically no nutritive value. It is, like beef juice, prone to decomposition by the intestinal bacteria. It is, therefore, contra-indicated.

Irrigation of the bowels once or twice in the twenty-four hours with physiological salt solution, or a 1% solution of boracic acid, is indicated to cleanse the colon. It has no direct healing action. The irrigation should be given with a soft rubber catheter, No. 25 French, passed as high as possible into the bowel, with the patient lying on the back with the hips elevated. The fluid is then allowed to run in from a bag hung not more than two feet above the level of the patient. It should be allowed to run in until the abdomen is slightly distended, then allowed to run out, and so on, until the wash water returns clean. The object of the irrigation is to cleanse the colon. Enough liquid should be used to do this, no matter whether it is much or little. Irrigation should never be done more than twice in the twenty-four hours. If it depresses or disturbs the patient much, it should be omitted, as under these conditions it does more harm than good.

Bismuth, salol and other preparations of like nature have, in the author's opinion, little or no effect on infectious diarrhea. It disturbs the patient to take them and interferes with the administration of food and water. It will be wiser, therefore, not to give them in this instance. Paregoric and other preparations of opium are, on general principles, contra-indicated in all forms of diarrhea, because their action is to diminish the number of movements by depressing peristalsis and not by relieving the cause of the increased peristalsis. The increased peristalsis is nature's effort to get rid of the poisonous intestinal contents. Nature's effort should, therefore, not be interfered with. In infectious diarrhea of the dysenteric type, however, when there is a very large number of small movements accompanied by pain and tenesmus which prevent the patient from getting proper rest, it is allowable to give opium in some form to diminish the excessive peristalsis and to quiet the patient. There is no danger, if proper care is used, of doing harm by retaining the intestinal contents too long. Paregoric, in doses of ten or fifteen drops, may be given in this instance, therefore, if necessary.

CASE 52. Pearl P., one year old, had always been well. She was fed on raw, unmodified cow's milk. She had had some slight disturbance of the bowels about the middle of July, but had almost entirely recovered. She suddenly began to vomit about noon, July 28. The vomitus consisted at first of milk, but soon became watery; it did not contain bile. Diarrhea came on in a few hours. The movements were at first fecal in character, but soon became watery and colorless. She vomited and had a movement every few minutes. Thirst became marked, but everything taken was vomited. Castor oil and calomel were also vomited. Her temperature that night was 104° F. The next morning she was much collapsed. She was seen in consultation at 9 A.M., twenty-one hours after the onset.

Physical Examination. She had evidently lost much weight. Her skin was dry and her extremities cold and blue. The fontanelle was much depressed. Her eyes were wide open and staring, but she took very little notice. The pupils were equal and reacted to light. Her tongue was dry. She held her head rigidly backward. The heart and lungs were normal. The abdomen was much sunken but not rigid. Neither liver nor spleen were palpable. She tossed her arms about constantly. Her legs were somewhat rigid; the knee-jerks were equal and exaggerated; Kernig's sign could not be determined because of the rigidity. The rectal temperature was 104° F., the pulse 160, and the respiration 60. The vomitus and movements looked like turbid water.

Diagnosis. The history and physical examination are so typical of CHOLERA INFANTUM that there is no need of considering any other disease. The nervous symptoms are due to a combination of toxemia and loss of fluid.

Prognosis. The prognosis is very grave. There is probably not more than one chance in twenty of recovery. The disease is, however, to a certain extent, self-limited. If she lives through the next thirty-six hours the chances of recovery will be very much better.

Treatment. The main indications for treatment in this condition are (1) to empty the stomach and bowels of their toxic contents; (2) to supply fluid to the tissues which are

being so seriously drained; (3) to restore the surface circulation; (4) to reduce the temperature; (5) to keep the patient alive until the disease has run its course.

Nature is already doing her best to empty the stomach and bowels. Nothing can be done to help her. Cathartics will be vomited and stomach washing and irrigation of the bowels will only increase the collapse. There is no objection, however, to giving the baby cool water to drink, even if it is vomited, as it will make her more comfortable and help to wash out the stomach.

The only way in which fluid can be supplied to the tissues is by the administration of physiological salt solution subcutaneously. She should be given from four to eight ounces at a time, repeated every three or four hours if absorbed.

The surface circulation is best restored by the application of heat externally in the form of heaters or hot packs. She should be at once surrounded with heaters and, if this is not successful, be put in a pack at 100° F., or a little higher. Restoration of the surface circulation will usually reduce the internal temperature. If it does not, irrigation of the colon with water at 90° F. will usually do so. Her temperature is hardly high enough to require this at present.

It is useless to give stimulants or other drugs by the mouth, as they will not be retained. All drugs must, therefore, be given subcutaneously. The best stimulant is caffein. This may be given subcutaneously in the form of caffeine-sodium benzoate. The dose for this baby is one quarter of a grain every three or four hours. Strychnia, in doses of 1-500 of a grain, may also be given subcutaneously, if necessary. Alcohol is contra-indicated. Adrenalin is indicated if the cardiac failure increases. Unfortunately it has very little action when given subcutaneously, and intravenous injection is very difficult in a baby of this age. If the restlessness increases, morphia, in doses of 1-100 of a grain, given subcutaneously, will aid by quieting her and saving her strength.

Food of any description is contra-indicated until the vomiting and diarrhea have stopped. The first food given should be a 1% solution of starch in the form of barley water, with 5% of milk sugar added.

CASE 53. Louise C., six years old, had complained for about a week of itching and burning about the anus, after going to bed. Her mother examined her the night before she was seen and found what she thought were pin-worms about the anus. She had no other symptoms whatever, did not pick her nose, was not nervous or irritable, had a good appetite and digested her food well.

Physical Examination. She was well developed and nourished and of good color. Her tongue was clean. The heart, lungs, liver, spleen, abdomen and extremities were normal. There was no irritation of the vulva or about the anus and no enlargement of the inguinal lymph nodes. The things which the mother thought were worms were examined and found to be really pin-worms.

Diagnosis. The symptoms in this instance, itching and burning about the anus after going to bed, are those most characteristic of PIN-WORMS and should always suggest their presence. The next most common symptom is irritation of the vulva and vagina. The symptoms usually thought to be pathognomonic of pin-worms — picking the nose, nervousness, irritability and disturbance of the digestion — are usually conspicuous by their absence and, if present, are almost invariably due to other causes. The diagnosis of pin-worms should never be made, however, unless, as in this instance, the worms are seen by the physician, because shreds of vegetable or fruit fibre are often mistaken for them by mothers and nurses.

Prognosis. It will require several weeks, and probably a number of months, of continuous treatment to completely eradicate the worms. If the treatment is kept up long enough however, it can certainly be done.

Treatment. The life history of the parasite shows the lines along which treatment must be directed. The eggs enter through the mouth, and are hatched in the small intestine. The worms reach their full development in the large intestine and lay their eggs in the rectum. The children get the eggs on their fingers, put their fingers in their mouths, and the circle is completed. Every precaution must be taken, therefore, to insure strict cleanliness and to prevent reinfection.

The next thing to do is to dislodge the worms from the upper bowel, wash them down and, if possible, out. She should, therefore, be given a tablespoonful of Epsom salts or some other saline to clean out the bowels. Salines are better than castor oil, because castor oil favors the absorption of santonin. When the bowels are well emptied, she should be kept on broth and toast for twenty-four hours and given three doses of one-quarter of a grain each of calomel and santonin during the day. This should be followed by another dose of Epsom salts.

It is evident that drugs given by the mouth can do but little good after the upper bowel has once been thoroughly cleared of the worms, since those that remain are all in the large bowel and rectum. They must be reached from below. She should, therefore, be given an enema of three ounces of sweet oil every night, followed in ten or fifteen minutes by an enema of a pint of soapsuds. The worms are caught in the oil and are washed out by the suds. These enemata must be kept up until no worms are obtained, and then for some weeks longer. If they are given up at once, the worms will almost certainly appear again in a few weeks.

CASE 54. Thomas S., five and one-half years old, was the child of healthy parents. He had always been well and vigorous, except for measles when two and whooping-cough when four years old. His appetite had not been very good for a year, but he had had no symptoms of indigestion and his bowels had moved regularly. He had had no cough, had slept well, had been to school regularly and had seemed unusually vigorous. He had not picked his nose, been irritable or showed any other signs of nervousness. He had passed worms, resembling angle worms, at times for a year, but his mother had paid no attention to it, because he seemed so well. She showed the last worm to some of her friends, however, and they frightened her so much that she brought him to the Infants' Hospital.

Physical Examination. He was well developed and nourished and of good color. His skin was in good condition. His tongue was clean and his nose and throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was a slight general enlargement of the peripheral lymph nodes.

The mother brought in a large round worm which he had passed three days before.

Diagnosis. The worm having been brought in and exhibited, there can be, of course, no doubt as to the diagnosis of ROUND WORMS. It is very noticeable, however, that there is nothing whatever in the history to suggest the presence of worms, except the fact that he has passed them. This is the usual story, and the symptoms ordinarily attributed to worms — picking the nose, pain in the abdomen, disturbance of the digestion, malnutrition, nervousness, irritability, sleeplessness and the like — are, as is ordinarily the case, all lacking. He has, in fact, not only shown none of these symptoms, but has been unusually well and strong.

Prognosis. The prognosis is good, as it is usually easy to eradicate round worms by the administration of santonin. The chances of reinfection are much less than they are with pin-worms.

Treatment. He should be given a tablespoonful of Epsom salts, or some other saline, to clean out the bowels. Salines are better than castor oil, because castor oil favors the absorption of santonin. When the bowels are well emptied, he should be kept on broth, with a little toast, for twenty-four hours and given three doses of one-half of a grain each of calomel and santonin at four hour intervals. This should be followed by one or more doses of Epsom salts. This course of treatment will, in all probability, result in the passage of all the worms in the intestine. It will be well, however, to examine the stools for ova in three or four weeks. If any are found, the treatment must be repeated.

CASE 55. Millard R. was admitted to the Children's Hospital when four and one-half years old. When two and one-half years old he passed a portion of a tape worm, consisting of 175 segments. He had passed small portions every few months since then, and a month before had passed a piece, consisting of 150 segments. He had been perfectly well, however, in every way. He had had no pain or discomfort and no disturbance of the digestion. He had not had a voracious appetite, had gained steadily in weight and had shown none of the nervous symptoms usually attributed to worms.

Physical Examination. He was well developed and nourished and of good color. His tongue was slightly coated. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis and the deep reflexes were normal. The segments which he brought with him were those of the tænia mediocanellata.

Diagnosis. He unquestionably has a TAPE WORM.

Prognosis. The worm will probably be obtained at the first trial, if sufficient care is taken in carrying out the details of the treatment. If it is not, the treatment must be repeated at intervals until the worm is finally obtained.

Treatment. It is very important to have the intestines emptied of everything but the worm before the anthelmintic is administered. The diet for the next two days should be made up of foods which have but little residue, such as clear soups, whey, white of egg and orange juice, and the amount should be limited to that just sufficient to satisfy the pangs of hunger. He may also have a little toast. He should be given enough of some cathartic, preferably Epsom salts or castor oil, to produce several large, loose movements of the bowels each day. He should be given a cup of hot beef tea or clear broth on waking the morning of the third day. This should be followed in one-half an hour by the anthelmintic. The best anthelmintic is Tanret's preparation of the tannate of pelletierine. The dose for this age is one-third of a bottle, which is equal to about one and one-half grains of the drug. If this drug is not obtainable, ten minims of the oleoresin of

aspidium may be given in its place. He should be given two tablespoonfuls of Epsom salts one-half hour later and one tablespoonful every subsequent hour until the worm is passed. He will be less likely to vomit the anthelmintic and the salts if he is kept up and walking about than if he lies still in bed. When the worm begins to come he should sit on a vessel filled with warm water, because the worm is less likely to break off and is more certain to be passed intact if it finds itself in comfortable surroundings. It should never be pulled, as it is almost certain to break if any force is used. If part of the worm remains in the bowel while the rest is out, it can often be dislodged by a large enema of warm water.

Everything which is passed should be saved and carefully examined in order to determine whether or not the head has been passed, the treatment being of no avail unless this is obtained. It is important to remember in this connection that the head is dark colored and not much larger than the head of a pin and that the upper part of the neck is very thin. Unless this is borne in mind, the head is very likely to be overlooked and thrown away.

SECTION IV.

DISEASES OF NUTRITION.

CASE 56. Cynthia M., the first child of healthy parents, was born at full term after a normal labor, and weighed ten and one-fourth pounds. The breast-milk gave out after two weeks and she was put on a rather strong modification of milk, on which, nevertheless, she did fairly well. She began to vomit when two months old and the gain in weight became very slow, but the movements remained normal. When four months old she was put on a home modified milk which contained about 2% of fat, 9.60% of sugar, 0.75% of whey proteids and 0.40% of casein. She had seven feedings of six ounces. She vomited less while taking this mixture, but continued to regurgitate. She had one normal movement daily, but her weight remained stationary. She had some colic. The sugar in the mixture was reduced to 6% and the vomiting and colic became less. When five months old, as she did not gain, she was changed to a home modified mixture which contained about 1.80% of fat, 1.10% of sugar, 0.90% of proteids and 0.50% of starch. She took seven feedings of six ounces. She was not at all satisfied, vomited less than before and had very little colic, but was somewhat constipated. The movements were normal in character. She held her weight the first week, but lost half a pound the second week. She was then seen, when six months old. She slept well, had plenty of fresh air and did not act sick.

Physical Examination. She was fairly developed and nourished. Her color was good. She was a little flabby. The fontanelle was level. The mouth was healthy and the tongue clean. She had one tooth. There was a very slight rosary. The heart and lungs were normal. The level of the abdomen was that of the thorax, and nothing abnormal was detected in it. The liver was palpable 1 cm. below the costal

border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. She weighed thirteen pounds.

The movement was yellow and salve-like in consistency, except in one place where it was a little granular and brittle. The odor was slight. The reaction was alkaline (presumably from the relatively large amount of proteid in relation to the fat). Microscopically it showed no undigested fat, starch or casein.

Diagnosis. The physical examination shows nothing abnormal except flabbiness and a slight rosary. The former is, of course, merely a sign of malnutrition. The rosary means rickets, but when it is slight and the only bony sign of the disease, as in this instance, the rickets is of practically no importance and need not be considered. The very slight amount of the vomiting and the normal movements show that there can be no disturbance of digestion sufficient to account for the loss of weight. The evident hunger and the tendency to constipation point strongly to an insufficient supply of food as the cause. Whether this is so or not can, of course, be determined practically by giving more food and awaiting the result. Proceeding in this way, however, there is no guide as to how much more food should be given. It is far better to calculate the caloric value of the food and thus know the truth at once, and, if the baby is under-fed, know how much so, and also how much more food to give.

A baby of six months requires, on the average, about 100 calories per kilo daily in order to thrive and gain. This baby weighs 5.9 kilos and, therefore, needs about 600 calories daily. It is not a difficult matter to calculate the caloric value of the food. Forty-two ounces equals 1,260 ccm.; 1.8% of fat equals 1.8 grams of fat in 100 ccm. of food, or 22.6 grams in 1,260 ccm. The caloric value of 1 gram of fat is 9.3 calories. The caloric value of the fat in the food is, therefore, 210 calories. The caloric value of proteid, sugar and starch being the same, 4.1 calories per gram, they can be calculated together. Figuring in the same way as for the fat,

they together furnish 129 calories. The total value of the food is, then, 339 calories or 57 calories per kilo, only a little more than half the caloric needs.

A baby must not only get a certain number of calories daily in its food, but it must also get at least 1.5 grams of proteid per kilo in order to thrive. It will gradually fail and die if the proteids are insufficient, even if the food contains a sufficient number of calories. This baby's food contained 0.9% of proteid or 11.3 grams in the 42 ounces. This is equal to 1.9 grams of proteid per kilo and amply covers the proteid needs. This ample supply of proteids explains her good general condition and the fact that she has not appeared sick.

The diagnosis is, therefore, MALNUTRITION FROM AN INSUFFICIENT SUPPLY OF FOOD. The knowledge that the caloric value of the food is insufficient also enables us to rule out infantile atrophy, a condition in which there is a progressive loss of weight, while the caloric value of the food is normal and there are no symptoms of indigestion.

Prognosis. The prognosis is, of course, perfectly good if the caloric value of the food is increased. There seems to be no reason why it cannot be in this instance as the stools show that all the components of the food are digested.

Treatment. The best food for infants, whether sick or well, is human milk. A wet nurse is, therefore, the best treatment for this patient. A wet nurse is not necessary in this instance, however, as the baby can undoubtedly be easily fed on some modification of cow's milk.

Past experience shows that it will not be wise to give this baby over six per cent of sugar. It is advisable to keep the fat down when babies vomit. It will, therefore, be wise to keep the percentage of fat as low as is consistent with meeting the caloric needs. There is no objection to giving a reasonably high percentage of proteids, as the baby has already shown her ability to digest them. It will be wise to continue the starch in the mixture, since the examination of the stools shows that the baby can digest it and it adds to the caloric value of the food. Six feedings of five and one-half ounces each ought to be about right for her age and weight.

The following formula meets these indications and covers both the caloric and proteid needs:

Fat,	2.50%
Sugar,	6.00%
Proteids,	1.50%
Starch,	0.75%

Six feedings of 5½ ounces give 565 calories, or 96 calories per kilo, and 14.8 grams of proteid, or 2.5 grams of proteid per kilo.

Approximately the same mixture can be prepared at home as follows:

Gravity cream (16%),	5 ounces
Skimmed milk,	10 ounces
Barley water (1.50% starch),	18 ounces
Milk sugar,	2 rounded and 1 level tablespoonful

Two teaspoonfuls of barley flour to a pint of water makes a 1.50% starch solution. One rounded tablespoonful of milk sugar is equal to about half an ounce.

No drugs are indicated.

CASE 57. David W., was born at full term and was the only child of healthy parents. There was no history of tuberculosis in the family and no known exposure to it. He weighed nine pounds at birth, but fell to six pounds in the first three weeks, and when seen in consultation at eleven months weighed but ten pounds. He had always been fed on milk, prepared in various ways. During the first month the mixture had been sterilized. This apparently upset the baby and caused considerable constipation. A little later he was given one part of whole milk to three of water, but as the movements contained curds, the strength was reduced to one part of whole milk to six of water. As he still passed curds, he was given a condensed milk mixture, containing one part of condensed milk to twelve of water. As he did not gain and continued to have curds in the stools, he was given a modified milk mixture prepared at a laboratory. He was at first given straight proteids of one per cent; later, part of the proteids were given in the form of whey proteids. He did better on this, but the movements still contained curds. This was stopped after a few months and he was put on condensed milk again. As he did not gain, he was put back on modified milk. During the last month he had been taking six feedings of $5\frac{1}{2}$ ounces of a mixture containing 2.75% of fat, 6.00% of sugar and 0.25% of proteids, but was not gaining.

He had been constipated during all this time, except for two short attacks of diarrhea a month or two before he was seen. He had always taken his food well and had almost never vomited. The movements had always been fairly well digested, except that they at times contained a few curds. He was a quiet baby and almost never fussed.

Physical Examination. He was small and poorly nourished. Pallor was marked. The skin was somewhat dry. The anterior fontanelle was 2 cm. in diameter, the level being somewhat below that of the surrounding bones. He had two lower incisors. There was no rosary. The heart and lungs were normal. The level of the abdomen was below that of the thorax; it was lax, easily palpable and showed nothing abnormal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The

extremities showed nothing abnormal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was a slight general enlargement of the superficial lymph nodes. The weight was ten and one-half pounds.

Diagnosis. The examination shows nothing except malnutrition. It gives no clue as to its cause. This must be sought in the history. In general, the causes of malnutrition which give no physical signs beyond those of malnutrition are congenital syphilis, chronic diffuse tuberculosis, infantile atrophy, chronic indigestion and starvation.

Disturbance of nutrition is the main symptom in some cases of congenital syphilis. The good family history, the absence of any other signs of syphilis and the presence of other causes for the malnutrition rule it out in this instance. The slight general enlargement of the superficial lymph nodes does not point either to syphilis or tuberculosis. It is common to all disturbances of nutrition in infancy and is, consequently, of no diagnostic value. Chronic diffuse tuberculosis, meaning by this term the condition in which there are numerous tubercular foci scattered throughout the body, larger and older than the miliary tubercle, but not large enough or so situated as to give physical signs, is not very infrequent in infancy. It cannot be recognized on physical examination, but only by the tuberculin test. It cannot be ruled out in this instance, but is less probable than some other conditions. The symptoms of indigestion are not sufficient to account for the malnutrition.

Barring chronic diffuse tuberculosis, which can only be positively excluded by a tuberculin test, the diagnosis lies, therefore, between infantile atrophy and starvation. The term, " infantile atrophy," should be limited to those cases in which there is a progressive loss of weight in spite of a sufficient intake of food, there being at the same time no symptoms of disturbance of the digestion. In this class of cases there is presumably some obscure disturbance of absorption or metabolism. Clinically they form a very definite group. It is probable, however, that, with the increase of our knowledge of chemical pathology, they will, in the future, be classified in some other way.

While he was taking the condensed milk and whole milk mixtures he was unquestionably not getting enough calories, but in the last mixture he got 105 calories per kilo, or just about enough to cover his caloric needs. A baby cannot thrive, however, even if the food contains a sufficient number of calories, if it does not also contain proteids enough to cover the proteid needs. The condensed milk and whole milk mixtures contained, respectively, 0.66%, 0.87% and 0.50% of proteids, which were probably not quite enough to meet the proteid needs. His last mixture gave but 0.5 grams of proteid per kilo, while he needed at least 1.5 grams of proteid per kilo. The diagnosis of infantile atrophy is, therefore, not justified because, while he is getting a sufficient number of calories, he is not getting enough proteid, and the condition is best called MALNUTRITION FROM AN INSUFFICIENT AMOUNT OF PROTEID IN THE FOOD. If he does not begin to gain weight when the proteid is increased enough to cover his proteid needs, the diagnosis will have to be changed to infantile atrophy, which has probably developed as the result of the continued insufficient supply of proteids.

Prognosis. The prognosis must be held in abeyance until the effect of an increase in the proteids is known. If he begins to gain when they are increased, the prognosis is good; if he does not, it is very grave unless he is given human milk. If he gets this he will probably recover, because babies with atrophy can usually utilize the proteids of human milk even if they cannot those of cow's milk.

Treatment. The treatment consists in the regulation of the food. Human milk is altogether the best food for him. It will almost certainly cure him whether the condition is proteid starvation or atrophy. If he cannot get this, the next best thing is some modification of cow's milk. He is digesting the present mixture, which, however, does not contain enough proteid. The natural thing to do, therefore, is to leave the percentages of fat and sugar unchanged and to increase the proteids to 0.75% in order to cover his proteid needs, keeping the number and amount of the feedings the same. There is no indication for medicinal treatment.

CASE 58. Helen S. was the second child of healthy parents. She was born January 1, at full term, after a normal labor, was normal at birth and weighed six and one-quarter pounds. She had never had anything but the breast and had done well in every way up to May 21, when she weighed thirteen pounds and four ounces. She had appeared perfectly well since then, but had not gained any in weight. She had formerly nursed for twenty minutes, but recently had nursed well for only four or five minutes, after which she would not try any more, although her mother felt very confident that the breasts were not emptied. She seemed satisfied and did not appear hungry before the next feeding time. She was nursed six times in the twenty-four hours. She did not vomit. The bowels moved daily without assistance, but the stools were small and hard. Her mother was well. She was taking about three pints of milk, cocoa and soup daily, as well as a little malt, and was gaining rapidly in weight. She thought, however, that, in spite of the extra liquid and malt, the amount of milk was somewhat less than it was a month before. The baby was seen June 6, when a little more than five months old.

Physical Examination. She was well developed and nourished and of good color. The anterior fontanelle was three cm. in diameter and level. The mouth and throat were normal. She had two teeth. There was no rosary. The heart, lungs and abdomen were normal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. She weighed thirteen and one-quarter pounds.

Diagnosis. The failure to gain in weight and the slight constipation, in the absence of all symptoms of illness, point strongly to an insufficient amount of food. So does also the voluntary shortening of the time of nursing, it being a very common thing for babies to stop nursing after they have satisfied the pangs of hunger, if the supply of milk is insufficient and it is very hard work to get it. The fact that she

does not appear hungry before the next feeding is not inconsistent with this explanation, because it is not very uncommon for babies not to appear hungry, even when the supply of milk is insufficient for them to gain on, if they are getting enough to cover their actual needs and to keep their weight stationary. The fact that her mother thinks there is still milk in the breast after she has stopped nursing is of no importance, because it is impossible for a woman to know whether there is milk in the breast or not, unless it is very full.

The trouble with the milk may be in the quantity, the quality or both. The only way to find out how much milk the baby is getting is to weigh it before and after every nursing for several days. It is not necessary to undress the baby to do this. The increase in weight will show, of course, how much milk has been taken. If the baby will not keep still, the mother can weigh herself before and after nursing. Her loss represents, of course, the baby's gain. The absence of all symptoms of indigestion and the failure to gain in weight show that the failure to nurse well is not because the milk is too rich as a whole, while the absence of symptoms of indigestion proves that there is no excess of any individual element. If there is any trouble with the quality of the milk, it must be, therefore, that it is weak as a whole or in some one of its constituents. The only way to find out whether it is or not, is to analyze it.

The baby was weighed before and after nursing for several days and found to be getting about three ounces at a feeding, or an average of eighteen ounces a day. The analysis of the milk showed that it contained 1.09% of fat, 6.50% of sugar and 1.91% of proteids. That is, she was getting only about one-half as much milk as she should and this milk was markedly deficient in fat. Eighteen ounces of this milk contained about 240 calories, which gave her only about 40 calories per kilo, or less than half enough to cover her caloric needs. The diagnosis of MALNUTRITION FROM AN INSUFFICIENT AMOUNT OF FOOD, which was made on the symptomatology, is, therefore, verified.

Prognosis. The mother is well; she is taking a sufficient amount of extra liquids and has been nursing for five months.

It is very improbable, therefore, that the amount of milk can be increased again, although it is possible that the percentage of fat can be made higher. The baby is in good condition and her digestion is normal. She can be confidently expected, therefore, to thrive and gain when enough modified cows' milk is added to her diet to cover her caloric needs.

Treatment. It is useless to attempt to increase the amount of the breast-milk by giving more liquids, because more than three pints of extra liquid in the twenty-four hours, instead of increasing the amount of milk, almost invariably either upsets the mother's digestion or makes her grow fat. It is possible that a somewhat larger proportion of fat and meat in the mother's food may increase the percentage of fat in the milk, although the evidence in favor of this action is not very convincing. It will be well, therefore, to have her take more cream, butter, meat and eggs than she has been taking. The liquids which are most useful in increasing the supply of milk are gruels; next to them, milk and cocoa. Preparations of malt have no especial value, and are likely to disturb the digestion of both mother and child. There are no drugs which have any action in increasing the supply of milk. The best way to increase or to keep up the supply of milk is to empty the breasts thoroughly at regular intervals. The baby should, therefore, be given both breasts at each nursing, the intervals and number of nursings being kept as they are at present. She should be weighed before and after nursing from time to time in order to determine about how much she is getting. She should then be given enough modified cows' milk after the breast to bring the amount at each feeding up to six ounces. The modified milk should contain a high percentage of fat to make up for the deficiency of fat in the breast-milk. A mixture containing 4% of fat, 7% of milk sugar and 1.75% of proteids will be a suitable one. There is no indication for the addition of an alkali. Eighteen ounces of this mixture, which, judging from the amount of breast-milk she has been taking, is about the amount which will be necessary to bring up the amount at each feeding to 6 ounces, contains nearly 400 calories. This will amply cover her caloric needs.

CASE 59 Almira R. was admitted to the Children's Hospital when thirteen months old. Her parents, who were Italians, were well, as were two older children. There had been no deaths or miscarriages. Her mother, who brought her to the hospital, could speak but little English and on this account but little could be learned about her. She was nursed entirely for five months, after which she was given food from the table in addition. She had recently been taking condensed milk, eggs, rice, macaroni, and probably many other things also, during the day and been given the breast at frequent intervals all night. She had been sick ever since she had begun to take other food in addition to the breast-milk. She had vomited every two or three days and had had several undigested stools daily. She had had a little cough recently, but her mother did not know whether she had been feverish or not.

Physical Examination. She was poorly developed and nourished and moderately pale. She was feeble, but noticed what was going on about her. The parietal and frontal eminences were somewhat enlarged and the top of the head flattened. There was no craniotabes. The anterior fontanelle was four cm. in diameter and slightly depressed. The tongue was covered with a moist, white coat. She had eight teeth. The area of the cardiac dullness could not be determined, because of the deformity of the chest. The sounds were normal and apparently in the normal position. There were no murmurs. There was a very marked rosary and a large depression on both sides of the chest, into which the flexed arms fitted. The sternum was prominent. There was marked flaring of the lower ribs. She was unable to sit alone and there was a marked curve of weakness. Both sides of the chest moved alike. There was moderate retraction of the lower ribs on inspiration. There was a small area of dullness at the angle of the scapula on the right and another small patch, at the level of the angle of the scapula, in the left posterior axillary line. Respiration in these areas was bronchovesicular. Fine and medium moist râles were heard all over the chest, both back and front. The abdomen was protuberant, soft and tympanitic. There was no

tenderness and no masses were felt. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line; the lower border was palpable four cm. below the costal border in the same line. The spleen was not palpable. There was moderate bowing of the lower legs and marked enlargement of the epiphyses at the wrists and ankles. There was no spasm or paralysis. The knee-jerks were equal and normal. There was a moderate general enlargement of the peripheral lymph nodes. The rectal temperature was 99° F.; the pulse, 120; the respiration, 35. She weighed fourteen pounds.

The leucocytes numbered 22,400.

The sputum contained no tubercle bacilli.

Diagnosis. The enlargement of the parietal and frontal eminences, the widely open fontanelle, the marked rosary, the deformity of the chest, the enlargement of the epiphyses at the wrists and ankles and the bowing of the legs justify the diagnosis of a high grade of RICKETS. The deformity of the chest is undoubtedly also due in part to the Italian method of swathing their babies. The disturbance of the nutrition due to the improper feeding is without question the chief cause of the rickets, although it is probable that improper hygienic surroundings and lack of fresh air and sunlight also played a part in its production. The râles and the two areas of dullness and bronchovesicular respiration show that there is an accumulation of liquid in the bronchi and partial solidification of the lungs. The absence of tubercle bacilli in the sputum shows that the trouble is not tubercular. Do these signs show that there is a bronchitis and bronchopneumonia or are they merely the manifestations of the retention of the bronchial secretions and atelectasis of the lungs as the result of the deformity and defective expansion of the chest? The physical signs are consistent with either condition, as is the increase in the rate of the respiration. The diagnosis must be made, therefore, in some other way. The leucocytosis seems, at first thought, to count strongly in favor of bronchitis and bronchopneumonia. It becomes of less importance, however, when the frequency of leucocytosis in disturbances of nutrition, associated with

anemia and rickets, is remembered. The normal temperature and pulse rate, on the other hand, are inconsistent with bronchitis and bronchopneumonia and are sufficient to rule it out. The diagnosis of ATELECTASIS OF THE LUNGS and retained secretions from defective expansion of the chest is, therefore, justified.

Prognosis. The disturbance of the digestion has lasted so long, her general condition is so poor, the deformity of the chest is so marked and it interferes so much with the expansion of the lungs that the chances are very much against her recovery. She probably will not live more than a few weeks. If she recovers, the improvement will be very slow and she will almost certainly be left with a misshapen chest.

Treatment. The treatment consists principally of regulation of her surroundings and her diet. She must be given the greatest possible amount of fresh air and sunlight. The best food for her is human milk, even if she is thirteen months old. Her mother's milk is insufficient in quantity and probably poor in quality. She ought, therefore, to have a wet nurse. If this is not feasible, the best substitute is some form of modified cows' milk. A mixture containing 3% of fat, 6% of milk sugar, 1.50% of proteids and 0.75% of starch, with lime water 20% of the milk and cream in the mixture, will be a suitable one. Seven feedings of six ounces at three-hour intervals should be sufficient for the present. Strychnia, in doses of $\frac{1}{600}$ of a grain, every four hours, will stimulate the respiration and improve her general condition.

CASE 60. George T. was the only child of healthy parents. He was born two months before he was expected. He had never been nursed, but had been fed on whole cow's milk, more or less diluted with water. He had never done well. He vomited at times directly after feeding, but never between feedings. His bowels were constipated; the movements were smooth. His head sweat a great deal. He was fussy and slept poorly. He was brought to the hospital when eleven months old.

Physical Examination. He was small and thin, weighing but nine pounds. Pallor was marked. He could hold up his head, but was unable to sit alone. When supported he sat with a marked general kyphosis. This disappeared when he lay on his face. The frontal and parietal eminences were so much enlarged that the top of the head showed a depression between them both longitudinally and across. The anterior fontanelle was 5 cm. in diameter and depressed. There was no craniotabes. The pupils were equal and reacted to light. There were no teeth. The mouth and throat were normal. There was a marked rosary and there was a depression around the lower part of the chest at the level of the insertion of the diaphragm, with moderate flaring of the ribs below. The heart and lungs were normal. The liver was palpable 3 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities showed nothing abnormal except a moderate enlargement of the epiphyses at the wrists and ankles. There was no spasm or paralysis; the knee-jerks were equal and normal. There was a moderate general enlargement of the peripheral lymph nodes. There was no eruption.

The urine was pale, slightly acid, of a specific gravity of 1,010 and contained no albumin.

BLOOD.

Hemoglobin,	25%
Red corpuscles,	2,566,000
White corpuscles,	15,000
Small mononuclears,	62%
Large mononuclears,	3%
Polynuclear neutrophiles,	34%
Eosinophiles,	1%

Case 60.

GEORGE T., Rachitic head. JOHN S., Hydrocephalic head.

Curve of weakness. Case 60.

There was moderate variation in the size, but none in the shape or staining reaction, of the red corpuscles. No nucleated forms were seen.

Diagnosis. The diagnosis is, of course, RICKETS and SECONDARY ANEMIA. The enlargement of the frontal and parietal eminences with the resultant "square" head, the rosary and the enlargement of the epiphyses at the wrists and ankles are pathognomonic of rickets. The weakness of the back, the large anterior fontanelle, the absence of teeth and the deformity of the chest are, in this instance, undoubtedly also signs of rickets, but are not pathognomonic, as they may be caused by other conditions.

The rachitic enlargement of the head, so well shown in this baby, is not infrequently mistaken for hydrocephalus. There should not, however, be any difficulty in distinguishing between them. The enlargement of the rachitic head is due to the overgrowth of bone on the outside; that of the hydrocephalic head, to increased pressure on the inside. The rachitic head is asymmetrical and flattened on top; the hydrocephalic, symmetrical and rounded. In the former the fontanelle is level or sunken; in the latter, bulging. In rickets the eyes appear normal; in hydrocephalus, they are prominent. These differences are well shown in the accompanying photographs.

The kyphosis seen in this instance is often mistaken for the deformity of Pott's disease. The diagnosis between them is, however, a simple one. The deformity in rickets is due to muscular weakness, is a general rounded curve, involving the whole spine, and disappears on extension. That in Pott's disease is due to deformity of the bone, is a local angular protuberance, involving only part of the spine, and does not disappear on extension.

The blood picture is that of a secondary anemia of a moderate grade. The percentage of hemoglobin is relatively lower than the number of red corpuscles. This "chlorotic" type of blood is characteristic of the secondary anemias of infancy. The white count is so little above the normal that it can hardly be called a leucocytosis, especially as the differential count of the white cells is normal for this age. The anemia should not be regarded as a symptom of the rickets, but merely as

another manifestation of the same disturbance of nutrition which caused the rickets. The fact that he was born prematurely probably predisposed him to the development of anemia, because premature infants have, as a rule, a smaller reserve supply of iron in the liver than those born at full term.

Prognosis. The prognosis as to life is good. The activity of the rachitic process will quickly cease under proper treatment, but the bony deformities will still remain. The rosary and enlargement of the epiphyses will disappear in a year or two. The deformity of the chest will probably never entirely disappear, and his head will probably always be a little large and peculiarly shaped, but not enough so to attract any attention.

Treatment. The treatment is hygienic and dietetic, not medicinal. He should be given the maximum amount of fresh air and sunlight and should be especially protected against all sorts of contagion.

Breast milk is undoubtedly the best food for him, although he is eleven months old. In all probability, however, he will not take the breast. The milk can be obtained, nevertheless, with a pump and fed to him in a bottle. Even a little human milk will help him to utilize modified cows' milk.

There are no special indications as to what proportion of modified milk will best suit him, except that he has not done well on the combination of low fat and sugar with high proteids, which he has had in the past. A reasonable mixture for him is:

Fat,	3.50%
Sugar,	7.00%
Proteids,	1.50%
Starch,	0.75%

An alkali is not indicated in this instance as there has been no disturbance of the gastric digestion. Six feedings of six ounces are sufficient for his weight. If the constipation continues on this mixture, he may have from one-half to two tablespoonfuls of orange juice daily. If this does not relieve the constipation, he may have from one-half to two teaspoonfuls daily of the milk of magnesia.

The saccharated carbonate of iron in three-grain doses, or ferratin in two-grain doses, will help the anemia. The author has not seen any better results when cod-liver oil and phosphorus have been given in addition to regulation of the diet and hygienic surroundings than when they have not, and consequently seldom prescribes them.

CASE 61. Dorothy C. was the only child of healthy parents. There had been one miscarriage subsequent to her birth. There was no tuberculosis in the family and she had had no known exposure to it. She was born at full term, after a normal labor, and weighed seven and one-half pounds. She was fed from the first on modified cows' milk and did well, except for some eczema on the face between the fifth and eighth months, until she was a year old, when she had an attack of infectious diarrhea. She was then well until she was two years old, since when she had had, three or four times each year, an attack of diarrhea, accompanied by distention of the abdomen and much loss of weight, lasting from three to five weeks. In these attacks she had from six to ten shiny, loose, green, foul movements daily. Four months before she was seen, she had a very severe attack of diarrhea from which she had not rallied, although the diarrhea ceased after the usual period. She was weak and had frequent, slight, dull headaches. She had become markedly pale. Her appetite was poor. She had no nausea or vomiting. Her bowels moved once or twice daily, the movements usually being more or less undigested, but sometimes constipated. Knock-knees had been noticed for a year and one-half. Her physician was sure, however, that she had shown no signs of rickets before she was five years old. She was seen in consultation, when seven and one-half years old.

Physical Examination. She was fairly developed and poorly nourished. Pallor was marked. She was intelligent, but listless. Her head was of normal size and shape. Her tongue was slightly coated, her teeth good, her throat normal. There was a venous hum in the neck. There was a moderate rosary and some flaring of the lower chest. There was also slight scoliosis. The lungs were normal. The heart was normal, except for a slight systolic murmur at both base and apex. When she stood, the whole abdomen was protuberant, the enlargement being most marked in the lower half. When she lay down, the level of the abdomen was that of the thorax. The upper half was tympanitic, the lower half moderately dull. There was dullness in the flanks, which changed slightly with change of position. There was no fluid wave.

There was no muscular spasm or tenderness, and no masses were felt. The upper border of the liver flatness was at the sixth rib in the nipple line. The lower border was felt just below the costal border in the same line. The upper border of the splenic dullness was at the eighth rib. The spleen was palpable three and one-half cm. below the costal margin. There was marked knock-knees and marked enlargement of the epiphyses at the wrists and ankles. There was no spasm or paralysis. The knee-jerks were equal and normal. The rectal temperature was 100.2° F.; the pulse, 120; the respiration, 25. She weighed, without her clothes, thirty and one-half pounds (the average is forty-three pounds).

The urine was of normal color, clear, acid in reaction and contained no albumin or sugar. The sediment contained a few squamous cells and leucocytes.

BLOOD.

Hemoglobin	42% (Sahli)
Red corpuscles,	3,600,000
White corpuscles,	32,000
Mononuclears,	44%
Polynuclear neutrophiles,	52%
Eosinophiles,	2%
Mast cells,	2%

There was moderate variation in the size and shape of the red corpuscles with a tendency to macrocytosis. There was moderate achromia and marked polychromatophilia. Four normoblasts and three megaloblasts were seen in counting one hundred white cells.

A stool, which was examined the day after taking 22 grams of fat, 223 grams of carbohydrates and 26 grams of proteid, was brown, foul and contained considerable mucus. There was no gross pus, but a few leucocytes were seen. No red corpuscles were seen with the microscope. There was a moderate excess of neutral fat and a considerable excess of fatty acids and soaps. There was no starch.

A skin tuberculin test was negative.

The Roentgenographs of the wrists, ankles and knees showed the typical changes of rickets.

Diagnosis. She has, without question, CHRONIC INTESTINAL INDIGESTION with acute exacerbations and with intolerance of fat. The large, pendulous abdomen is, in all probability, due to the enlargement of the intestines as the result of the chronic intestinal indigestion. The dullness in the flanks and the slight change in dullness with change of position is, without question, due to the presence of liquid feces in the lax intestines and not to free fluid in the peritoneal cavity.

The rosary, the flaring of the lower chest, the scoliosis, the knock-knees and the enlargement of the epiphyses are positive signs of rickets. If the testimony of the parents as to her good health during the first two years and that of her physician that she showed no signs of rickets before she was five years old can be believed, the rickets must have developed recently, that is, it is a case of LATE RICKETS. The Roentgenographs show signs of active, not of healed, rickets and, therefore, corroborate the diagnosis.

The macrocytosis, the presence of megaloblasts and the slight excess of mononuclear cells suggest to a certain extent pernicious anemia. The other characteristics of the blood are, however, those of SECONDARY ANEMIA. The blood picture, as a whole, is typical of the secondary anemia with leucocytosis seen in infancy. It is probable that in connection with the rickets, usually a disease of infancy, there has also been a reversion of the hemopoietic system with the resulting formation of a younger type of blood. Enlargement of the liver and spleen are not uncommon in the disturbances of nutrition associated with rickets and anemia in infancy. It is presumable that the enlargement in this instance is also simply a manifestation of the same disturbance of nutrition which is the cause of the rickets and the anemia.

The sequence of events has been apparently as follows: chronic intestinal indigestion with acute exacerbations and with intolerance of fat; disturbance of the nutrition as the result of the chronic intestinal indigestion, with the development of rickets, secondary anemia and enlargement of the liver and spleen. It is possible that the intolerance of fat has resulted in sufficient loss of calcium to result in the develop-

ment of rickets. This is, however, somewhat doubtful. The whole picture is a very common one in infancy, but extremely rare in childhood.

Prognosis. She will almost certainly recover in time. It will require, however, many months, and probably years, of the greatest attention to her diet, hygienic surroundings and care.

Treatment. The treatment consists primarily in regulation of the diet to her digestive capacity. Fat must be entirely cut out and the required number of calories made up by an extra amount of carbohydrates and proteid. (See Case 44.) The elimination of the fat from the food will presumably influence the rachitic process favorably. There is no indication for the administration of calcium salts, because there is certainly no deficiency in these salts in the food, the disturbance of ossification being due to inability either to absorb or to make use of them. The author has not seen any better results when cod liver oil and phosphorus have been given in rickets than when they have not, and seldom prescribes them. Intolerance of fat would seem, moreover, to contraindicate the use of cod liver oil in this instance. It will be well to give her both arsenic and iron for the anemia. She should be given one minim of Fowler's Solution, well diluted, three times daily, after meals. The dose should be increased one minim daily until toxic symptoms appear. It should then be reduced to the last dose which did not cause toxic symptoms and kept there. She should be given ten grains of the saccharated carbonate of iron or ferratin, three times daily, after meals. She should be given, of course, the maximum possible amount of fresh air and sunshine, should be kept in bed for the present and guarded in every way against fatigue and exposure.

CASE 62. Pauline P. was born July 15 at full term after an instrumental labor, was normal at birth and weighed eight pounds. Her father learned, about July 1, that he had pulmonary tuberculosis and went West about two weeks after she was born. She was put at once on modified milk and did very well. About October 1, when ten weeks old, she went West and joined her father. He slept out of doors and was very careful not to expose her to infection. After going West she was fed on equal parts of whole milk and water, prepared with Mellin's Food. This did not agree with her very well. She returned to her home in the East, February 1, having been with her father about four months. She was then put on a mixture of whole milk and water, prepared with " Peptogenic Milk Powder." In the course of the preparation of the food, the milk was brought to a boil. She had been taking this food for three and one-half months when she was seen. She had taken and digested it well and gained steadily in weight.

She stopped creeping about April 20. April 26 she fell out of a low chair to the floor, striking on her forehead. She did not seem hurt, except for a bruise on the right side of the forehead. Beginning with the next day she cried a great deal during her bath, and May 1 it was noticed that motions of the legs caused pain. The pain on motion of the legs increased. She lay on her back and kept her legs drawn up. When quiet in this position she had no pain. She was very much afraid of being touched and began to cry when any one approached her. The upper gums became inflamed about May 10. Her appetite had fallen off and she had lost some weight and much color since the appearance of the pain, although she had shown no signs of indigestion. Her temperature had not been taken, but she had not appeared feverish. The urine had not stained the diapers. She was seen in consultation May 17, when ten months old.

Physical Examination. She was fairly developed and nourished and moderately pale. She was very much afraid of being touched. The fontanelle was level. There was an ecchymosis, about the size of a five-cent piece, on the right side of the forehead. The two lower central incisors had

erupted and the gum was normal about them. The upper gum was distended by the four incisors. The gum was a little purplish over them. The tongue was clean and the throat normal. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The spine was perfectly flexible. She preferred to lie on her back with the legs flexed at the hips and knees. Neither active nor passive motions were limited, but motions at the hips and knees caused much pain. There was no definite tenderness and no swelling about the bones or joints. The arms were not tender and were used freely without discomfort. The knee-jerks were equal and normal; Kernig's sign was absent; sensation to touch and pain was normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F.

Diagnosis. Tuberculosis of the spine or hip-joints had been seriously considered by the physician in charge because of the known exposure to tuberculosis. The normal mobility of the spine and at the hips, together with the normal temperature, rule this out. The grandmother thought that the fall might be the cause of the pain. The baby had, however, stopped creeping before the fall and showed no evidence of injury at the time. It is hard to conceive, moreover, of an injury which would involve both legs and not show any physical signs. Infantile paralysis and multiple neuritis might be thought of on account of the pain. Infantile paralysis can be at once excluded because of the absence of paralysis and the presence of normal reflexes after three weeks. Multiple neuritis can be ruled out because at this age it is almost always a sequela of diphtheria and, consequently, is seldom accompanied by pain. The reflexes are intact, moreover, and there is no paralysis or disturbance of sensation. Osteomyelitis and periosteitis seldom occur in more than one place at a time and can be excluded on the good general condition and the absence of fever and localized tenderness. The combination of pain without physical signs is characteristic of rheumatism in early life. Rheumatism almost never occurs in early infancy, however, and will not account for the swollen

and purplish gum. The slow onset, the unwillingness to use the legs, the pain on motion and the position in which the legs are held are almost pathognomonic of SCURVY and justify that diagnosis without any other evidence. The combination of these signs with the swollen, purplish gum, another characteristic sign of scurvy, cannot be accounted for in any other way, and makes the diagnosis absolute. The ecchymosis on the forehead may be a scorbutic manifestation but, on the other hand, may be simply the result of the fall. The prolonged use of boiled milk is corroborative evidence of the diagnosis of scurvy, as it is undoubtedly one of the causes of this disease.

Prognosis. The prognosis is absolutely good. She will be perfectly well in a week if properly treated.

Treatment. The first step in the treatment is to remove the probable cause of the disease, that is, boiling the milk. There seems to be no reason for changing the composition of the food as she was doing very well on it except for the scurvy. The mixture contains 2% of fat, 6.50% of sugar and 1.75% of proteids. It is always unwise to continue peptonization over long periods because it tends to weaken the digestive power. It will, therefore, be wise to replace the " Peptogenic Milk Powder " (which is composed largely of milk sugar) by milk sugar and to add starch, in the form of barley water, to hinder the formation of large curds. The following combination is a suitable one:

Whole milk,	24 ounces
Barley water (1.50% starch),	24 ounces
Milk sugar,	4 rounded tablespoonfuls

This mixture contains 2% of fat, 6.50% of sugar, 1.75% of proteids and 0.75% of starch. The sugar should be mixed with the hot barley water and the mixture cooled before the milk is added. She should take six feedings, of from seven to eight ounces.

She will undoubtedly recover in time on the " fresh " food, but recovery will be slow. Fruit juices, however, have a specific action in infantile scurvy, and should, therefore, always be given. They will cure the process even if the cause is not removed. Orange juice is the best, because it is the

Deformity of legs in Scurvy.

most readily taken. Babies seldom object to it. It may be given plain or diluted with water. There is no objection to the addition of cane sugar if the orange is sour. It may be given all at one dose or divided into two doses. It is best given about an hour before a feeding, when the stomach is empty. One ounce is the proper dose. Less than this may be ineffectual, more is unnecessary. She should have, therefore, an ounce of orange juice daily. This dose should be continued until all symptoms of the disease have disappeared. It will be wise to keep it up for some time longer, but the dose need not be as large.

CASE 63. Laliah P. was the first child of healthy parents. She was born at full term and weighed six and one-half pounds. She had always been fed on pasteurized milk prepared at a laboratory. She had done very well until she was six months old, when she ceased to gain and lost her appetite. When she was seven months old her mother noticed that the urine at times stained the diapers red. This staining was attributed by the physician in charge to uric acid. It continued intermittently for a month, when the urine was examined and found to contain fresh blood, but no casts. Micturition was not increased in frequency and was not painful. There were no other symptoms whatever except failure to gain in weight. She was seen in consultation when eight months old.

Physical Examination. She was well developed and nourished, but somewhat pale and flabby. She was bright and happy. The anterior fontanelle was 3 cm. in diameter and level. The mouth and throat were normal. There were no teeth. There was no rosary. The heart and lungs were normal. The level of the abdomen was somewhat above that of the thorax; it was everywhere tympanitic and nothing abnormal could be detected. Very careful examination failed to find any enlargement of the kidneys. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal. There was no spasm, paralysis or tenderness. Neither active nor passive motions caused pain. The knee-jerks were equal and normal; Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. She weighed thirteen pounds.

The urine was pale with a slightly reddish tinge, feebly acid, of a specific gravity of 1,006 and contained a trace of albumin. The sediment showed a few red blood corpuscles and an occasional leucocyte, but no other formed elements.

Diagnosis. The only causes of hematuria, not associated with bleeding elsewhere, in infancy, which really deserve consideration are irritation from crystals of uric acid, sarcoma of the kidney and scurvy. Tuberculosis of the kidney is almost unheard of at this age, and, when present, the urine

more often contains pus than blood. Vesical calculi are also very unusual at this age and rarely cause hematuria at any age unless the patient is very active. Irritation from uric acid crystals can be ruled out in this instance on the examination of the urine. The absence of frequent and painful micturition also make it improbable. The hematuria is perfectly consistent with either sarcoma of the kidney or scurvy. Pain is rare in sarcoma at this age, and constitutional symptoms are usually absent until the tumor has attained considerable size. Hematuria appears before the tumor is palpable in about forty per cent of the cases. Hematuria is not infrequently the earliest symptom of scurvy, appearing before pain and tenderness in the extremities or sponginess of the gums. An absolute diagnosis between sarcoma and scurvy in this instance is, therefore, impossible. The chances are very much in favor of scurvy, however, because of the much greater frequency of scurvy than of sarcoma of the kidney, the long continuance of the pasteurization of the milk, which predisposes to the development of scurvy, and the loss of appetite and failure to gain in weight, which usually precede and are almost invariably associated with scurvy. The chances are, in fact, so much in favor of SCURVY that it is justifiable to make a positive diagnosis of this disease and to consider sarcoma as merely an extremely remote possibility.

Prognosis. The prognosis is perfectly good. The bleeding will almost certainly cease within a week under proper treatment.

Treatment. The treatment is simple. It consists in stopping the pasteurization of the milk and in giving an ounce of orange juice daily. If it is inadvisable in any instance to omit pasteurization because of an unreliable supply of milk or hot weather, orange juice alone will cure the trouble.

CASE 64. Margaret M. was the ninth child of healthy parents. All the others, except one that had died at birth, were alive. There was no history of tuberculosis in the family and no known exposure to tuberculosis.

She was born at full term and was breast-fed for three weeks, since when she had been fed on condensed milk. The movements had always been green and loose. She had, however, taken her food well, had not vomited and had gained fairly well in weight. She began to vomit about the middle of July and a week later began to have from five to seven movements daily. These were watery, green or yellow in color, had a foul odor and contained a few small curds and considerable mucus. Blood was noticed once. She was admitted to the Children's Hospital August 7, when three months old. Her temperature was then 104° F., but, as the result of treatment, dropped to normal the next day, where it remained, except for a rise of temperature lasting two days a few days later.

Physical Examination at entrance. She was poorly developed and much emaciated. There was moderate pallor. The mouth and tongue were red and dry. The anterior fontanelle was 3½ cm. in diameter and depressed. The bones of the skull overlapped a little. There was no rosary. The heart and lungs showed nothing abnormal. The abdomen was sunken, but otherwise negative. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities showed nothing abnormal. The knee-jerks were not obtained. The cervical lymph nodes were slightly enlarged. A few dysentery bacilli were found in the stools.

Under careful treatment and feeding the vomiting and number of movements diminished and their character steadily improved, so that on August 17 she was having two pasty, yellow movements daily. She took her food well and did not vomit. At that time she was taking twelve feedings of two ounces of a mixture containing 2% of fat, 5% of sugar, 0.25% of whey proteids and 0.25% of casein. Her weight, however, had fallen from five pounds and fourteen ounces to five pounds and eight ounces. Her general condition was, if

anything, worse than a few days before. The amount of food was increased to two and one-half ounces on the 18th, while the fats were increased to 2.50% and the sugar to 6% on the 19th. She took her food well and did not vomit, but continued to have from two to four perfectly normal movements daily. In spite of this, however, she continued to lose about one ounce daily, so that on the 21st she weighed but five pounds and four ounces.

Diagnosis. The physical examination shows nothing abnormal except the signs of malnutrition. It gives no clew as to its cause. The striking thing in the history is the progressive loss of weight without any symptoms of indigestion or fever. The trouble is undoubtedly a recent one and the result of the mild attack of infectious diarrhea, since the baby had previously done fairly well. The only two conditions which need to be considered are starvation and infantile atrophy. The food taken August 17 gave 115 calories and 1.4 grams of proteid per kilo, and that taken August 19, 160 calories and 1.6 grams of proteid per kilo, more than enough to cover both the caloric and proteid needs. Starvation can, therefore, be ruled out. The picture corresponds exactly to the definition of INFANTILE ATROPHY, a condition in which there is a progressive loss of weight in spite of a sufficient intake of food, there being at the same time no symptoms of disturbance of the digestion.

Prognosis. The prognosis is practically hopeless unless the baby can get human milk. The chances are not very good if she can, because there is a strong probability that the disturbance of metabolism has gone so far that she will not be able to utilize even human milk.

Treatment. The only treatment which offers any reasonable chance of recovery is human milk. She must have it at any cost. There is no other food which is worthy of consideration in this instance. There is nothing to be hoped from medicinal treatment.

SECTION V.

SPECIFIC INFECTIOUS DISEASES.

CASE 65. Bessie F. was born November 21, 1894. She was seen in consultation May 10, 1900. Both her parents had died of pulmonary tuberculosis during the previous year. She had lived with them up to the time of their death. One brother, six years old, was well. There had been no other children.

She had measles when two years old and was said to have had influenza in February, 1900. She began to complain of pain in the abdomen about the first of March, 1900. The pain continued for several weeks and then ceased. Swelling of the abdomen was noticed about the middle of March and had slowly but steadily increased. Her appetite was good. She vomited after breakfast, however, two or three times a week. Her diet was a reasonable one for her age. Her bowels moved once in two or three days. The character of the movements had not been noted. She had had a cough during the day for about a month. She had lost both flesh and color.

Physical Examination. She was well-developed and fairly nourished, but somewhat pale. She was bright and happy. Her tongue was moist and moderately coated. The heart was normal. There was slight dullness in both backs below the eighth space, with normal but somewhat diminished respiration and voice sounds. Fine, crackling, moist râles were occasionally heard in the dull area. The upper border of the liver flatness in the nipple line was in the fourth space. The lower border of flatness was 3 cm. above the costal border. The splenic dullness could not be determined. The edge of the spleen was not felt. The abdomen was much enlarged and the walls were tense. The distention was uniform. There was no enlargement of the superficial abdominal veins. There was dullness in the lower portion and in both flanks.

While the child lay on her back the upper line of dullness was concave. The rest of the abdomen was tympanitic. The area of dullness changed with change of position. A fluid wave was present. There was no edema of the extremities or of the face. There was no enlargement of the superficial lymph nodes. The rectal temperature was 99° F.; the pulse, 120. The urine showed nothing abnormal; the blood was not examined.

Diagnosis. The principal abnormality observed in the physical examination is the presence of fluid in the abdominal cavity. Both borders of the liver are higher than they should be, while the total width of the liver flatness is normal, showing that the liver is merely displaced upward by the pressure of the fluid in the abdomen. The absence of the splenic dullness is presumably due to its displacement upward and backward. The râles show that the dullness and diminished respiration and voice sounds in the lower backs are not due to fluid in the pleural cavities. They are satisfactorily explained by the displacement of the liver upward and the consequent compression and congestion of the lower portions of the lungs. This condition also explains the cough.

The dullness in the flanks, the concavity of the upper border of the dullness, when she lies on her back, and the change of the area of dullness with change of position prove that the fluid is free in the abdomen and not confined in an ovarian or other cyst.

Free fluid in the abdominal cavity may be due to causes either within or without the cavity. When due to causes outside of the abdominal cavity, there is usually edema of other parts of the body and, if the trouble is in the heart, the signs of passive congestion in other organs. The absence of edema and of the signs of passive congestion and the normal condition of the heart and urine rule out all causes outside of the abdomen in this instance.

The possible causes located within the abdomen are those diseases and conditions which result in portal congestion and diseases of the peritoneum. The two causes of portal congestion are disease of the liver and compression of the portal vein. The absence of enlargement of the spleen and of the

superficial abdominal veins makes portal congestion very improbable. The normal size of the liver practically excludes disease of this organ. The age of the child is also much against any chronic disease of the liver. The absence of an alcoholic or syphilitic history and of all signs of syphilis, the two most common causes of chronic disease of the liver at this age, makes disease of the liver still more improbable. Compression of the portal vein is usually due to a new growth of some sort, usually enlarged lymph nodes, they, in turn, usually being tubercular. In the light of the prolonged exposure to tuberculosis, a tubercular infection of the abdominal lymph nodes is not at all unreasonable in this instance and cannot be excluded on the negative physical examination, because an enlarged lymph node, too small to be palpable, can, if located in the right place, exert much pressure on the portal vein. As already explained, however, the absence of enlargement of the spleen and of the superficial abdominal veins makes portal congestion very improbable.

The diseases of the peritoneum to be considered are chronic serous peritonitis, malignant disease of the peritoneum and tubercular peritonitis. There is much doubt as to whether there is such a disease as chronic serous peritonitis. If there is, it almost never occurs before puberty. Malignant disease of the peritoneum is extremely rare, almost always results in palpable tumors and is accompanied by greater cachexia than is present in this instance. Both of these conditions can be excluded, therefore, if any other more reasonable explanation can be found. Tubercular peritonitis of the ascitic form is not at all uncommon at this age; the onset and progress of the illness in this instance are most characteristic of this disease; the prolonged exposure to tuberculosis makes a tubercular infection very probable. The diagnosis of TUBERCULAR PERITONITIS seems, therefore, amply justified.

An examination of the ascitic fluid will aid materially in confirming the diagnosis. The fluid from portal congestion is a transudation; that from disease of the peritoneum, an exudation. In the former the specific gravity of the fluid is below 1,015 and it usually contains less than 2% of albumin, while in the latter, the specific gravity is above 1,015 and it

usually contains more than 4% of albumin. The cells in a transudation are usually few and endothelial in character. The fluid in tubercular peritonitis usually contains many cells, and these are largely lymphocytes. Characteristic tumor cells are not infrequently found in the fluid when there is malignant disease of the peritoneum. Tubercle bacilli may often be found in the fluid in tubercular peritonitis, and animal inoculations are almost always positive. The diagnosis of tubercular peritonitis is, however, justified in this instance without an examination of the fluid.

A skin tuberculin test would be of interest in this child, but not of great aid in diagnosis. If positive, it merely shows that the child has a tubercular focus somewhere, not that the trouble in the abdomen is tubercular, although it is, of course, important corroborative evidence. If negative, it does not prove that the trouble in the abdomen is not tubercular, because the test is often negative when the tuberculosis is of the miliary type, as it is in this instance.

Prognosis. Favorable points in this instance are the unusually good general condition, the absence of fever and of evidences of tuberculosis elsewhere. Her chances of recovery are probably about even, provided she can have proper treatment.

Treatment. The author does not believe in a routine operative treatment in this disease, even in the ascitic form, and does not think that, on the whole, the cases that are operated on do any better than those that are not. He believes in leaving the fluid alone unless it is causing too much discomfort or doing harm by the compression of other organs. He then believes in tapping rather than in opening the abdomen, leaving the latter as the last resort when the abdomen fills up rapidly after tapping. The treatment as regards the ascites is, therefore, in this instance, expectant. The further treatment is that of tuberculosis in general: an out-of-door life, day and night; quiet and forced feeding. There is no indication for drugs.

CASE 66. Mary D., seven years old, was the child of healthy parents. Three other children were well and one had died at birth. There was no tuberculosis in the family and no known exposure to tuberculosis.

She was born at full term after a normal labor. She was nursed for eight months and did very well. During her fourth year she had had diphtheria, measles, whooping-cough and chicken pox, and was not in very good health during the next year. Since then she had been very well indeed.

She was taken suddenly sick July 30 with a pain in the abdomen, but did not go to bed. The next day she vomited everything she took except water, and the pain continued. The pain and vomiting were worse on August 1 and she stayed in bed most of that day. She vomited the morning of August 2, but had no pain. She had no pain and did not vomit on the 3d and 4th, but stayed in bed. The bowels had moved regularly; the character of the movements was not known. She entered the Children's Hospital August 5.

Physical Examination. She was well developed and nourished. She lay comfortably in bed and did not look acutely sick. The pupils were equal and reacted to light and accommodation. There was no rigidity of the neck. There was moderate pallor of the skin and mucous membranes. The tongue was moist and covered with a thin white coat. The throat was normal. The heart and lungs showed nothing abnormal. The liver flatness extended from the upper border of the sixth rib to the costal margin; the edge was not felt. The upper border of splenic dullness was in the eighth space; the edge was not felt. The abdomen was full and the walls were held rigidly. Examination was difficult, deep palpation being impossible. There were no rose spots. An indefinite mass was felt above the symphysis pubis, extending one half way to the umbilicus. This mass was still present after the bladder had been emptied by catheterization. There was also an indefinite resistance just above the right iliac crest. There was dullness in this region and over the mass in the hypogastrium. There was no shifting dullness and no fluid wave. There was slight general tenderness throughout the abdomen. The extremities showed nothing abnormal. There

was no spasm or paralysis. The knee-jerks were not obtained. The plantar reflexes were normal. There was no edema. There was slight enlargement of the cervical lymph nodes. Rectal examination showed nothing abnormal. The temperature was 102° F.; the pulse, 94; the respiration, 25.

Urine (drawn by catheter): Normal color, acid, 1,018, no albumin or sugar. The sediment contained a few leucocytes and a few fine granular and hyaline casts.

Blood: Leucocytes, 13,700.

Diagnosis. The points which are of value in the differential diagnosis in this instance are an acute abdominal affection of five days' duration; the good general condition; a definite tumor in the hypogastrium when the bladder is empty; an indefinite resistance and dullness above the right iliac crest; the negative rectal examination; and the slight degree of the leucocytosis.

The only diseases which are really worthy of consideration are appendicitis, some disease of the female pelvic organs and tubercular peritonitis. The urine shows merely a mild degenerative nephritis, which is of no importance either in diagnosis or in prognosis. The fever is consistent with all of these diseases and is, therefore, of no aid in the differential diagnosis.

The history is much more suggestive of appendicitis than of the other conditions. Against it are the good general condition in spite of the tumor in the abdomen, the location of the tumor, the presence of another indefinite mass, the negative rectal examination and the slight degree of the leucocytosis.

The location of the tumor is consistent with some inflammatory process in the female pelvic organs. Against this diagnosis are the extreme rarity of inflammatory processes in these organs at this age, the location of the other indefinite mass, the negative rectal examination (which at this age amounts to a vaginal examination), and the slight degree of the leucocytosis.

In favor of tubercular peritonitis is the presence of two masses, presumably due to the same cause, which do not correspond to the findings in any other condition and which

are consistent with the lesions found in tubercular peritonitis. The fact that these masses cannot be felt on rectal examination is not inconsistent with the location of the tumors in tubercular peritonitis, but is with that of the tumors of appendicitis and inflammatory processes in the pelvic organs. The slight degree of the leucocytosis is also consistent with tubercular peritonitis. The absence of a family history of or exposure to tuberculosis and the acuteness of the onset may be urged against the diagnosis of tubercular peritonitis. A tubercular family history is, however, of little or no importance either for or against tuberculosis unless there has been exposure. The absence of a history of exposure to tuberculosis does not count in any way against tuberculosis, although, of course, a history of exposure points strongly toward it. The history of measles and whooping-cough in the past, both of which are known to predispose to the development of tuberculosis, is of some importance in this instance. An onset as acute as in this instance is unusual, but not uncommon enough to count much against the diagnosis of tubercular peritonitis. The good general condition is more consistent with this disease than with the others under consideration. The diagnosis of TUBERCULAR PERITONITIS is, therefore, justified. It is undoubtedly of the caseous or fibrocaseous type.

Prognosis. The prognosis in this type of tubercular peritonitis is not nearly as good as in the ascitic form. She probably has about one chance in three of recovery.

Treatment. Operation cannot possibly do any good in this instance. The masses are too extensive to be removed, and opening the abdomen cannot of itself be of any benefit. The further treatment is that of tuberculosis in general; an out-of-door life day and night, quiet and forced feeding. There is no indication for drugs.

CASE 67. Olga R., seven years old, was the fourth child of healthy parents. The other children were well and there had been no miscarriages. There was no history of tuberculosis in either family and there had been no known exposure to it. She was nursed for ten months and was very well until she had the diphtheria, when four years old. She had not been as vigorous since then, but had had no illnesses, except a primary pleurisy with effusion a year before.

She began to cough a little, early in July. She did not seem sick, however, until two weeks later, when she became somewhat feverish and lost her appetite. The fever gradually increased and after four days she went to bed and remained there. The fever had continued, but the cough had diminished. She had perspired freely at night, but had had no chills. Her appetite had been very poor. She had vomited twice the night before. The bowels had moved daily without help and the stools had appeared normal. She had complained of pain in the abdomen for several days. She was admitted to the Children's Hospital, August 5.

Physical Examination. She was well developed but poorly nourished. Her skin was somewhat pale, but the mucous membranes were of good color. She was perfectly clear mentally. The pupils were equal and reacted to light. Her tongue was moist and covered with a thick, white coat. The heart was normal. There was slight dullness with slightly diminished but vesicular respiration on the left side below the fifth rib in the mid-axillary line and the eighth in the scapular line. There was no change in the vocal resonance or tactile fremitus and no friction rub nor râles were heard. The liver was not palpable. The upper border of the splenic dullness was at the ninth rib, the edge was not palpable. The level of the abdomen was slightly below that of the thorax. It was everywhere tense and generally tender. The muscular spasm and tenderness were, however, most marked in the right lower quadrant. The abdomen was tympanitic throughout and no masses could be felt. There were no rose spots. There was no spasm or paralysis, but she lay with her legs drawn up. The knee-jerks were equal and

normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The rectal examination showed nothing abnormal. The rectal temperature was 103.8° F.; the pulse, 148; the respiration, 40.

The urine was normal in color, turbid, acid in reaction, of a specific gravity of 1026, and contained no albumin or sugar. The sediment consisted of amorphous urates and a few small, round cells.

The leucocytes numbered 11,700.

The Widal test was negative.

Diagnosis. The absence of rose spots and enlargement of the spleen, together with the negative Widal reaction after two weeks, the frequent pulse and the sunken, rigid abdomen rule out typhoid fever. Appendicitis is strongly suggested by the greater intensity of the muscular spasm and tenderness in the right lower quadrant. The duration of the illness before the onset of pain in the abdomen and vomiting, the regular action of the bowels, the absence of dullness and tumor in the right iliac fossa and the negative rectal examination are very much against it. The most important point against it, however, is the normal white count, an increase in the number of white cells being a constant accompaniment of appendicitis, unless the system is overwhelmed by the toxemia. The good general condition shows that this is not the case in this instance. Appendicitis can, therefore, be excluded. The low white count in combination with the good general condition also rules out all forms of septic general peritonitis.

There is, nevertheless, evidently some extensive inflammatory process going on in the abdomen, almost certainly in the peritoneum. The only acute general disease of the peritoneum which is not accompanied by leucocytosis, provided that the patient is not overwhelmed by toxemia, as this child is not, is tuberculosis. The diagnosis of TUBERCULAR PERITONITIS is, therefore, a reasonable one, and seems warranted by the facts. The history of the primary serous pleurisy, which, in childhood as in later life, is almost invariably tubercular, is another point in favor of this diagnosis. The dullness and diminished respiration in the lower left

back and axilla are probably due to thickening of the pleura as the result of this illness.

Prognosis. She is not in any immediate danger. The acuteness of the symptoms will probably last but a short time, after which the course and prognosis will be that of tubercular peritonitis in general. The fact that there has also been a tubercular infection of the pleura in this instance renders her chances of recovery rather less favorable than the average.

Treatment. There is at present no indication for a laparotomy. She must be kept quiet in bed, given a maximum amount of fresh air and sunlight and fed carefully. Her diet for the present should consist of milk, broth, cereals, milk toast, baked custard and junket. The temperature is not high enough to require special treatment. There is at present no indication for the use of stimulants.

CASE 68. Frank S. was the only child of healthy parents. He had always been breast-fed and had never had any disturbance of the digestion. He lived during the first two months of his life in a house with a young man who had pulmonary tuberculosis and had since died of it. The young man had, however, not been much with him. He was well until he was a little over five months old, when he had what was called bronchopneumonia. He did not recover well from this illness and the cough continued. He had lost weight and strength rapidly during the last month. He was admitted to the Infants' Hospital when eight months old.

Physical Examination. He was fairly developed and nourished and somewhat pale. The anterior fontanelle was two cm. in diameter and slightly depressed. The bones of the skull overlapped a little. The mouth and throat were normal. He had no teeth. There was a moderate rosary. The heart was normal. There was dullness in the left front above the fourth rib and in the back above the spine of the scapula. The sense of resistance was not markedly increased. The respiration was nowhere normal in this area, being in some places bronchial and in others bronchovesicular. The voice sounds were increased. There was no change in the tactile fremitus. There were numerous fine, medium and coarse, high-pitched, moist râles in this area. There was an occasional fine, moist râle in both lower backs. The right lung was otherwise normal. The abdomen was sunken, but showed nothing else abnormal. The lower border of the liver was just palpable below the costal border in the nipple line. The spleen was not palpable. The extremities and genitals were normal, as were the deep reflexes. There was a general slight enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F.; the pulse, 120; the respiration, 30. He weighed eleven and one-half pounds.

Diagnosis. The only abnormal physical signs outside of those in the lungs are the rosary and the general evidences of malnutrition. The rosary being the only sign of rickets, it is fair to conclude that the rickets is an unimportant factor. It is also reasonable to assume that, since he has always been nursed and has never had any disturbance of digestion, the

disturbance of the nutrition is due to the trouble in the lungs. The fine, moist râles at the bases of the lungs behind are undoubtedly due merely to defective expansion of the lungs. The signs at the left apex are those of partial solidification. This may be due to a chronic bronchopneumonia or to tuberculosis. The long duration of the symptoms, the localization of the signs in one spot, the absence of evidences of bronchitis and the normal temperature are much against bronchopneumonia and in favor of tuberculosis. The history of a definite exposure to tuberculosis during the first two months of his life makes the diagnosis of PULMONARY TUBERCULOSIS almost certain. An absolutely positive diagnosis is impossible, however, on this data. It should be confirmed by an examination of the sputum or a skin tuberculin test. The failure to find tubercle bacilli in the sputum will not exclude tuberculosis, because it is often very difficult to get a satisfactory sample in infancy. A negative tuberculin test will practically rule it out, while a positive test at this age is almost certain proof that the suspected lesion is tubercular.

Prognosis. The prognosis of pulmonary tuberculosis at this age is hopeless. He will probably live for three or four months, unless the process becomes disseminated, when he will die in a few weeks.

Treatment. There is no medicinal treatment. Human milk, which he is now getting, is the best food for him. He must be given all the fresh air and sunlight possible. Further than this, nothing can be done.

CASE 69. Elizabeth N. was an only child. Her mother was well, but her father had "bronchitis and pleurisy" and, being unable to work, remained at home to take care of her while her mother went out to work. She was nursed for three months, after which she was fed on condensed milk. She had never had any disturbance of the digestion, but during the last few weeks her appetite had been very poor. She began to cough when five months old. She was treated in the wards of the Children's Hospital for ten days, when six months old, for what was thought to be bronchopneumonia. When she was discharged the lungs were normal except for slight dullness in the lower left back. Her temperature had been normal for five days. She was readmitted to the Children's Hospital when she was eight months old. The cough had persisted, being worse during the last two weeks. She had recently lost weight very rapidly.

Physical Examination. She was poorly developed and nourished, pale and feeble. The anterior fontanelle was one and one-half cm. in diameter and sunken. The bones of the skull overlapped. The throat was slightly reddened and the tongue slightly coated. She had two teeth. There was a slight rosary. The right border of the cardiac dullness was two cm. to the right of the median line; the left and upper borders could not be determined because of the dullness in the left chest. The action was regular and the sounds normal. The left side of the chest moved less than the right. There was marked dullness over the whole left side, except between the spine of the scapula and its angle, where the percussion note was flat. The sense of resistance was somewhat, but not markedly, increased. The respiration was everywhere diminished, in places being bronchial, in others bronchovesicular in character. There was a small area at about the middle of the scapula where it was amphoric. The voice sounds were loud and bronchial in the flat area; diminished, but changed in character, elsewhere. The tactile fremitus was somewhat increased, especially in the flat area. A few medium and coarse moist râles were heard both in front and behind. There were also many fine and medium moist râles in the right back. The abdomen was a little

full, but otherwise normal. The liver was just palpable in the nipple line. The spleen was not palpable. The epiphyses at the wrists and ankles were slightly enlarged and there was moderate clubbing of the fingers and toes. The peripheral lymph nodes were slightly enlarged. The rectal temperature was 99° F.; the pulse, 140; the respiration, 55.

The leucocyte count was 35,500.

Diagnosis. There can be no doubt from the examination of the chest that there is more or less complete solidification of the whole left lung and, judging from the amphoric respiration, a small cavity at about its middle. There is also a bronchitis on the right side. There are no evidences of an accumulation of fluid. It is safe to conclude from the long duration of the symptoms, the emaciation without disturbance of the digestion and the clubbing of the fingers and toes that the condition is a chronic one. The only disease which at this age can cause such extensive solidification with cavity formation, limited to one lung, is tuberculosis. Further evidence in favor of tuberculosis is the father's illness, which is almost certainly tuberculosis. There is, therefore, every reason why she should have tuberculosis. The large number of white cells does not count against it, because at this stage there is almost invariably a secondary infection with the pus organisms. The enlargement of the peripheral lymph nodes does not count either for or against tuberculosis, because enlargement of the peripheral lymph nodes occurs in all disturbances of nutrition in infancy. The diagnosis of PULMONARY TUBERCULOSIS is, therefore, the only one possible. The rosary and the enlargement of the epiphyses show that she also has a mild grade of rickets.

Prognosis. The prognosis is absolutely hopeless. She probably will not live more than a week.

Treatment. The treatment can be only symptomatic.

CASE 70. Elizabeth D. was 12 years old. Her father died of pulmonary tuberculosis before she was born. Her mother continued to live in the same house. Her only brother died of diabetes mellitus when he was ten years old. She had measles and mumps when four months old and had trouble with her digestion for a time when she was ten years old. She had always been tall and slight and rather easily tired. She had had a dry cough for three months, which was more troublesome during the day than at night. She had had no pain in her chest and had raised almost nothing. Her mother thought that she had been a little feverish in the late afternoon and early evening. Her appetite was good and she had no disturbance of the digestion. She had not been weighed for some months, but her mother thought that she had lost a little weight.

Physical Examination. She was tall and slight, but of good color and did not look sick. She breathed quietly with her mouth shut. The throat was normal, the tongue nearly clean. The right chest moved somewhat less than the left and the respiratory sound was diminished over the whole of the right side. There was dullness with bronchovesicular respiration (more nearly bronchial than vesicular), prolonged expiration, increased spoken and whispered voice, increased fremitus and an occasional high-pitched moist râle at the right apex in front above the third rib. The heart was normal. The liver and spleen were not palpable. The abdomen and extremities were normal. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 99.4° F. She weighed, with her clothes, eighty-three pounds (average is 78.7 pounds).

Diagnosis. The slow onset of the symptoms and the signs of partial solidification at the right apex, together with the slight fever and the history of exposure to tuberculosis in infancy, present such a characteristic picture of the development and early stage of PULMONARY TUBERCULOSIS, as it occurs in later childhood, that there can be no doubt as to the diagnosis. The only other possibility is a local infection of the lung by the influenza bacillus. This is not at all probable but, in order to make the diagnosis positive, the

sputum should be examined and the skin tuberculin test tried. The finding of tubercle bacilli in the sputum will make the diagnosis absolute; a positive tuberculin reaction will be only corroborative evidence.

Prognosis. The area of lung involved is comparatively small, she is in good general condition, her appetite and digestion are good, she has the reparative power of growth to help her. The chances are, therefore, if she has proper treatment, much in favor of recovery.

Treatment. The treatment of pulmonary tuberculosis at this age is essentially the same as in adult life. She must leave school and devote all her energies to getting well. She should live out of doors day and night and for the present keep as nearly absolutely quiet as possible. She should have three regular meals daily and milk and eggs between them. There is no indication for drugs except possibly for some simple sedative, like chloroform water, to control the cough.

CASE 71. Margaret M. was admitted to the Infants' Hospital when 18 months old. She had lived with her mother up to the time of the latter's death from pulmonary tuberculosis, a year before. She had been boarded out since then and the woman who brought her knew practically nothing as to her history. During the first two weeks of her stay in the hospital she took her food fairly well, did not vomit and had regular, somewhat constipated, but well digested movements. She lost three-quarters of a pound during this time. Her temperature varied irregularly between 100° F. and 103.5° F., her pulse between 120 and 140, and her respiration between 45 and 50. The subcutaneous tuberculin test was not tried, because of the elevated and irregular temperature. The skin tuberculin test was unknown at that time.

Physical Examination. She was poorly developed and nourished and moderately pale. The anterior fontanelle was three cm. in diameter and depressed. She had five teeth. The mouth and throat were healthy. She was able to sit up, but the spine showed a marked curve of weakness. There was a very slight rosary. The heart was normal, except for a soft, systolic murmur at the base. There was a venous hum in the neck. There was slight dullness with increased bronchovesicular respiration, slightly increased voice sounds and an occasional high-pitched moist râle in the left front above the third rib. The lungs were otherwise normal. There was no dullness between the scapulæ, but the bronchial voice was heard as low as the fourth dorsal spine. The lower border of the liver was palpable one cm. below the costal border in the nipple line. The spleen was not palpable. The level of the abdomen was that of the thorax. Nothing abnormal was detected in it. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was a general slight enlargement of the peripheral lymph nodes. She weighed ten and one-half pounds.

The urine was pale, acid in reaction, of a specific gravity of 1010 and contained neither albumin nor sugar.

BLOOD.

Hemoglobin,	52%
Red corpuscles,	4,528,000
White corpuscles,	13,800
Small mononuclears,	12%
Large mononuclears,	7%
Polynuclear neutrophiles,	80%
Eosinophiles,	1%

There was considerable variation in the size of the red cells and slight irregularity in their shape and color. No nucleated red cells were seen while counting 250 leucocytes.

Diagnosis. The changes in the blood are characteristic of secondary anemia. The murmur at the base of the heart and the venous hum in the neck are undoubtedly due to the anemia. The absence of all evidences of indigestion during her stay in the hospital, although she lost weight rapidly during this time, shows that the malnutrition is not due to any disease of the gastro-intestinal tract. Infantile atrophy would have to be considered, if it were not for the fever and signs in the lung. The rosary, which is the only positive sign of rickets, is so slight that it is evident that the rickets is merely another evidence of the disturbance of nutrition. The signs at the left apex and the fever suggest broncho-pneumonia. The disturbance of nutrition is, however, undoubtedly of long duration, there are no other foci in the lungs, no evidences of bronchitis and almost no leucocytosis. A tubercular infiltration will explain the physical signs at the left apex equally well, and, when the prolonged exposure to tuberculosis during the first six months of her life is taken into consideration, seems much more probable. The disturbance of nutrition is, however, greater than would be expected from the limited extent of the process in the lungs and suggests the presence of tuberculosis elsewhere. The bronchial voice sound over the upper dorsal spines shows that there is enlargement of the tracheo-bronchial lymph nodes. Enlargement of these nodes is so seldom due to anything but tuberculosis that it is safe to conclude that they are tubercular in this instance. There is no positive evidence of tuberculosis elsewhere, the peripheral lymph nodes being

enlarged so commonly in all disturbances of nutrition in infancy that it is impossible to tell whether they are or are not tubercular. The disturbance of nutrition is so marked, however, and the tendency to dissemination is so great in infancy, that it is safe to assume that there are other foci of tuberculosis in the body and that the process, instead of being simply a local one in the lungs, is a CHRONIC DIFFUSE TUBERCULOSIS.

Prognosis. The prognosis is absolutely hopeless. She probably will not live more than two or three weeks.

Treatment. Nothing whatever can be done for her except to make her as comfortable as possible.

CASE 72. George G., three years old, was the child of healthy parents. One other child was well and one had died of cerebrospinal meningitis "caused by a fall." There had been no miscarriages. There was no tuberculosis in the family and no known exposure to tuberculosis. He had always been perfectly well.

It was noticed on September 4 that his appetite was poor and that he seemed dull, sleepy and tired. He continued in this condition, although up and about the house, until September 10, when he went to bed. He vomited in the night and the next day seemed decidedly worse and began to complain of pain in the abdomen. That night he became restless, threw his head back on the pillow and "kicked out with his feet." He also became very cross and irritable. The irritability continued, but he remained conscious. He vomited again on September 12. The bowels were constipated from the beginning, moving only with enemata. The pain in the abdomen continued. He made no complaint of headache. Strabismus appeared on September 14 and persisted. That night he began to cry out as if in pain. This symptom continued. He was admitted to the Children's Hospital September 16.

Physical Examination. He was fairly well developed and nourished, but looked sick. He was dull mentally but conscious. He could not speak plainly, but was able to make his wants known. He was irritable and cried out occasionally as if in pain. There was double convergent strabismus. He was able to see. The pupils were dilated and equal, but did not react to light. There was no discharge from the nose or ears. The lips were red and cracked. The tongue was dry and covered with a moderate brown coat. The tonsils were slightly reddened and prominent. There was no herpes. The heart and lungs showed nothing abnormal. The level of the abdomen was below that of the thorax; there was no definite muscular spasm; it was tympanitic and not tender; no masses were made out. The upper border of the liver flatness was at the upper border of the fifth rib; the edge was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. There were no rose spots or

petechiæ. The head was not held backward, but there was slight rigidity of the neck and complete flexion was resisted and caused pain. There was no spasm or paralysis of the extremities. The knee-jerks were normal and equal. Kernig's and Babinski's signs were absent. There was no ankle clonus. Sensation to pain was normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 102° F., the pulse 110 (normal is 100), the respiration 30. The urine was high-colored, strongly acid, of a specific gravity of 1,026, and contained neither albumin nor sugar. The blood showed 23,000 leucocytes.

Diagnosis. The early history suggests nothing more than a disturbance of digestion. The completed history points strongly to meningitis, although typhoid with symptoms of meningeal irritation is a possibility. The strabismus, the dilated and reactionless pupils, the slight rigidity of the neck and the pain on motion, the absence of enlargement of the spleen and of rose spots and the leucocytosis are sufficient, when taken together, to positively rule out typhoid. The absence of retraction of the head and of marked rigidity of the neck, of spasm or paralysis of the extremities and of Kernig's and Babinski's signs, as well as of changes in the knee-jerks, is somewhat unusual, but not enough so to count materially against meningitis. The relatively low pulse is consistent with either condition. The diagnosis of meningitis is, therefore, certain.

The diagnosis of meningitis, however, is not sufficient. It is necessary to go further and to determine the kind of meningitis. When meningitis does not develop in the course of some other acute disease it is practically invariably either tubercular or cerebrospinal, and other types do not need to be considered. The diagnosis in this instance, therefore, lies between the tubercular and cerebrospinal forms. The diagnosis between tubercular and cerebrospinal meningitis in infancy and early childhood is often a very difficult one, because most of the points which help in the diagnosis in later childhood are so uncertain at this age that little dependence can be placed upon them. In most cases, however, a very probable diagnosis can be made.

In this instance the absence of a tubercular family history and of exposure to tuberculosis does not count at all against tubercular meningitis or in favor of cerebrospinal meningitis. The slow onset is in favor of the tubercular form, but does not, by any means, rule out the cerebrospinal. The absence of herpes and eruptions does not count against the cerebrospinal form or in favor of the tubercular, because herpes and eruptions are very unusual in cerebrospinal meningitis at this age. Retraction of the head, marked rigidity of the neck, spasm and paralysis of the extremities, Kernig's and Babinski's signs, and changes in the pupils may be absent in both, but are more often wanting in the tubercular form. The leucocytosis is in favor of cerebrospinal meningitis, but is not inconsistent with the tubercular form, in which a leucocytosis sometimes occurs. The weight of the evidence is, therefore, somewhat in favor of TUBERCULAR MENINGITIS, enough so, in fact, to justify this diagnosis. There is, however, a reasonable possibility that the trouble really is cerebrospinal meningitis. The only way in which an absolute diagnosis can be made is by lumbar puncture. Since lumbar puncture is a harmless procedure, and since cerebrospinal meningitis can in most instances be cured by the antimeningitis serum, a lumbar puncture should be done at once in order that he may have the advantage of the serum treatment if the disease is cerebrospinal meningitis instead of tubercular meningitis, as it seems.

The normal cerebrospinal fluid is perfectly clear, like distilled water, does not form a fibrin clot on standing, and never contains more than 0.1% of albumin, or more than twenty cells per cubic millimeter. The vast majority of these cells are mononuclear. The fluid in tubercular meningitis is usually slightly turbid, sometimes clear, rarely very turbid or purulent, forms a fibrin clot on standing and contains more than 0.1% of albumin and more than twenty cells per cubic millimeter. The vast majority of these cells are mononuclear, usually lymphocytes, the percentage varying from 80 to 98. The proportion of polynuclear cells usually increases with the progress of the disease. Tubercle bacilli can be found in the fluid in about ninety per cent of the cases, if the examination

is careful enough. If the examination is hasty, they will usually be missed. A fluid should never be passed as normal because it appears clear when drawn. If a fibrin clot does not form in twenty-four hours, tubercular meningitis can be excluded. The fluid in cerebrospinal meningitis is usually markedly turbid, often purulent, sometimes nearly clear, forms a fibrin clot or a sediment of pus on standing, contains more than 0.1% of albumin and several hundred cells per cubic millimeter. The vast majority of these cells are polynuclear, the percentage usually varying between 75 and 90. The percentage of mononuclear cells gradually increases and finally exceeds the polynuclear in cases which recover. The meningococcus is almost invariably present in the acute stage. Under normal conditions the cerebrospinal fluid flows out slowly, drop by drop, while in both forms of meningitis it usually, but not always, flows out more rapidly or even spurts out.

The fluid obtained by lumbar puncture in this instance was slightly cloudy, showed a definite fibrin clot in six hours, and contained one hundred and twenty-five cells to the cubic millimeter, 83% of which were lymphocytes. No organisms were seen in the examination of one cover slip. The diagnosis of tubercular meningitis is, therefore, verified by the results of the lumbar puncture.

Prognosis. It is true that there are a few instances on record of recovery from tubercular meningitis. These are, however, so few in comparison with the vast number of fatal cases that it is not justifiable to give anything but an absolutely hopeless prognosis.

Treatment. There is no curative treatment for tubercular meningitis. Repeated lumbar punctures will, however, often relieve headache and other symptoms of increased cerebral pressure, such as convulsions and twitching. It has no effect on the progress of the disease, and is not indicated at present in this instance. In spite of the hopeless prognosis, he must be nursed and fed as if he were certain to get well. If he will not swallow, he must be fed with a tube. Further treatment must be symptomatic.

CASE 73. Marion H., seven months old, was the second child of healthy parents. There had been no deaths or miscarriages and she had had no known exposure to tuberculosis. She was born at full term, after a normal labor, and was normal at birth. She had always been nursed and had had no illnesses, except an occasional "cold." She had been restless and nervous when awake since April 14, but had slept most of the time. She had nursed poorly, but had not vomited. Her bowels were constipated. Several stools, which were passed after she had taken castor oil, were greenish and contained curds and mucus, but no blood. She had had some discharge from the nose and eyes since April 17. She had had no convulsions, rigidity or twitching, and had not coughed. Her mother thought that she had not been feverish. She was admitted to the Infants' Hospital, April 19.

Physical Examination. She was well developed and nourished, and of good color. Her head was of normal size and shape. There was slight craniotabes. The posterior fontanelle was not quite closed. The anterior fontanelle was five cm. in diameter and bulged markedly. The ear drums were normal. There was a purulent discharge from the eyes. The pupils were equal and reacted to light, but she did not notice. The nares were crusted. She had no teeth. The mouth and throat were normal. There was no rigidity or tenderness of the neck and no neck sign. There was a marked rosary. The heart and lungs were normal. The abdomen was sunken but not rigid; nothing abnormal was detected in it. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal, except for slight enlargement of the epiphyses at the wrists. She held her arms a little rigidly. The knee-jerks were equal and lively. Kernig's sign was absent, as was the contralateral reflex. There was no enlargement of the peripheral lymph nodes and no eruption. The rectal temperature was 105° F.; the pulse, 130; the respiration, 30.

The urine was of normal color, clear, acid in reaction and contained neither albumin nor sugar.

Diagnosis. The history throws but little light upon the diagnosis. Otitis media and pyelitis, which should always be thought of in infancy when the symptoms are as indefinite as in this instance, can be excluded on the normal condition of the ears and urine. Pneumonia, which should be considered in spite of the absence of cough, can be ruled out on the normal condition of the lungs and the fact that the respiration is relatively slower than the pulse. The undigested stools suggest to a certain extent disease of the digestive tract. When it is remembered, however, that there are no other symptoms of indigestion, that they appeared only after a dose of castor oil and that undigested stools are the rule in all serious illnesses in infancy, it is evident that the trouble must be located elsewhere. The late appearance of the discharge from the nose and eyes shows that these organs were affected secondarily.

The craniotabes, the open posterior fontanelle, the large size of the anterior fontanelle, the rosary and the enlargement of the epiphyses at the wrists are all signs of rickets and have no connection with the present illness. The one important positive physical sign is the bulging of the anterior fontanelle. This shows that there is an increase in the intracranial pressure. The normal size and shape of the head and the absence of separation of the bones of the cranium show that this increase in pressure is not due to chronic internal hydrocephalus and that it is of recent development. For all practical purposes, the only cause of an increase of intracranial pressure sufficient to cause bulging of the anterior fontanelle in infancy is meningitis. This sign is, of itself, enough to warrant the diagnosis of meningitis, even if all other signs of the disease are lacking. A positive diagnosis of meningitis is, therefore, justified. The failure to notice and the slight rigidity of the arms are corroborative evidence of its correctness.

The meningitis in this instance did not develop in the course of any other disease. It is, therefore, almost certainly either tubercular or cerebrospinal. It is always difficult, and not infrequently impossible, to make a diagnosis on the symptomatology between these two forms in infancy. The slow

onset and the absence of marked signs of cerebral irritation are somewhat in favor, however, of the tubercular type. A lumbar puncture must be done, nevertheless, to settle the diagnosis, because of the possibility of cure by the use of the antimeningitis serum, if it is caused by the meningococcus.

A lumbar puncture was done, and 20 cc. of very slightly turbid fluid, under moderate pressure, allowed to run off. This fluid formed a small fibrin clot and contained 80 cells to the cubic mm., 90% of which were mononuclear. No organisms were seen in the examination of one slide. (See Case 72.) A positive diagnosis of TUBERCULAR MENINGITIS is thus warranted.

Prognosis. The prognosis is hopeless. (See Cases 72 and 74.) She probably will not live more than four or five days.

Treatment. The treatment can be only symptomatic. (See Cases 72 and 74.)

Opisthotonos in Meningitis.

CASE 74. Bessie M., eighteen months old, was the third child of healthy parents. The two older children had died in infancy, one of pneumonia, the other of infectious diarrhea. There had been no miscarriages. She had not been exposed, as far as known, to tuberculosis. She was born at full term, after a normal labor, and was normal at birth. She had had no illnesses, with the exception of an occasional "cold." She was still on the breast, but took several feedings daily of milk and barley water. There had been no indiscretion in diet before the onset of her illness. She had an attack of vomiting, followed by a convulsion, May 13. She had vomited four or five times daily since then, but had had no more convulsions. She was stupid after she came out of the convulsion, however, and had so remained. There had been no rigidity, twitching or retraction of the head at any time. She had been given nothing but the breast since the onset of her illness and had taken this very poorly since May 17. The bowels had been somewhat constipated, but the stools were well digested. She was admitted to the Infants' Hospital, May 20.

Physical Examination. She had evidently lost much weight. She was very pale, with a slight tinge of cyanosis about the lips. She lay perfectly limp and almost never moved. The anterior fontanelle was two cm. in diameter and level. There was no rigidity or retraction of the neck and no neck sign. The pupils were widely dilated and reacted but little to light. She did not notice. The ear drums were normal, as were the mouth and throat. She had eleven teeth. There was no rosary. The heart and lungs were normal. The respiration was of the Biot type. The abdomen was much sunken, but not tense. Nothing abnormal was detected in it. The liver and spleen were not palpable. The extremities were normal. There was no spasm of the extremities. She did not respond in any way to the prick of a pin. There was, however, probably no paralysis, because she sometimes moved both her arms and legs. The knee-jerks were absent, as was Kernig's sign and the contralateral reflex. There was no enlargement of the peripheral lymph nodes and no eruption. The vasomotor irritability

of the skin was, however, much increased. The rectal temperature was 102° F.; the pulse, 170; the respiration, 50.

The urine was high in color, acid in reaction, of a specific gravity of 1030 and contained neither albumin nor sugar.

The leucocytes numbered 10,000.

Diagnosis. The sudden onset with vomiting suggests acute gastric indigestion. The absence of any indiscretion in diet, the persistence of the vomiting in spite of an exclusive diet of breast-milk, and the absence of all signs of intestinal indigestion are, however, against this diagnosis. So also is the stupidity, which is out of proportion to the severity of the symptoms of gastric disturbance. The continued vomiting, the constipation and the stupidity are, moreover, consistent with meningitis. Uremia, which in an older child or an adult would also be suggested by these symptoms, is very uncommon in infancy and can be excluded at once on the normal condition of the urine. The widely dilated pupils, the diminution in the reaction of the pupils to light, the failure to notice, the Biot type of respiration and the increased vasomotor irritability of the skin all point strongly to meningitis. It is unusual, however, to have spasm, paralysis, the knee-jerk, Kernig's sign, the neck sign, the contralateral reflex and bulging of the fontanelle all absent in meningitis. The absence of bulging of the fontanelle is especially strong evidence against it. The rapid pulse and respiration do not count against it, however, because, contrary to the general belief, slowing of the pulse and respiration occurs but seldom in meningitis in infancy. While bulging of the fontanelle, if acute, is almost certain proof of meningitis in infancy, the absence of bulging does not rule it out, because the intracranial pressure is sometimes not increased enough to bulge the fontanelle, especially if the exudation is markedly purulent or gelatinous. In the so-called flaccid type of tubercular meningitis, moreover, flaccidity is the most prominent symptom and all signs of cerebral irritation are, as in this instance, absent. In the absence of all physical signs of any other disease, the diagnosis of meningitis seems justified. The sudden onset points to the cerebrospinal type; the absence of leucocytosis, to

the tubercular form. Flaccidity and the absence of all evidences of cortical irritation are less unusual in tubercular than in cerebrospinal meningitis. A probable diagnosis of TUBERCULAR MENINGITIS of the flaccid type seems, therefore, a reasonable one. A lumbar puncture should be done, however, to confirm the diagnosis (see Cases 72 and 73).

Lumbar puncture was done and ten cc. of a very slightly turbid fluid, under low pressure, allowed to run out. This fluid contained eighty cells to the cubic millimeter and formed a fine fibrin clot. The cells were all lymphocytes. No organisms were found on a hasty examination. The diagnosis of tubercular meningitis is, therefore, correct.

Prognosis. The prognosis is hopeless (see Cases 72 and 73). She probably will not live more than two or three days.

Treatment. The treatment can be only symptomatic (see Cases 72 and 73).

CASE 75. Girdham D., three years old, took rather a long walk with his mother the afternoon of December 27, which was a very cold and windy day. He had sausages for supper, which was not an unusual occurrence, and went to bed apparently perfectly well. He vomited several times during the latter part of the night. A physician who saw him the next morning found nothing abnormal on physical examination. He cleaned him out with castor oil, gave him bicarbonate of soda and limited his diet to broth and albumin water. He did not vomit any more, had a comfortable day and slept well the night of the 28th. He was a little stupid all day on the 29th, but from time to time complained of headache. In the afternoon the physician found that his neck was a little stiff and that his pulse was irregular. The bowels had not moved during the day. He was seen in consultation at 6 P.M.

Physical Examination. He was well developed and nourished and of good color. He was somewhat stuporous but, when roused, was rational, although irritable. Passive movements of the neck were a little limited and caused some pain. The neck sign was absent. The membranæ tympanorum showed nothing abnormal. The pupils were equal and reacted to light. There was no enlargement of the cervical lymph nodes. The tongue was moderately coated, the throat normal. The heart was normal, except that it was somewhat irregular in force and rhythm. The lungs and abdomen showed nothing abnormal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's and Babinski's signs were absent; there was no contralateral reflex. The rectal temperature was 101° F., the pulse 140.

Diagnosis. The only conditions to be considered in this instance are intestinal toxemia and meningitis. The appearance of the symptoms of disturbed digestion immediately after the taking of improper food, following over-exertion and exposure to cold, make toxemia the more probable. The only things which really suggest meningitis are the persistence of the symptoms after catharsis and limitation of the diet and

the slight rigidity of the neck. Disturbances of digestion and toxemia not infrequently persist, however, after catharsis and starvation, and symptoms of meningeal irritation are not at all uncommon in intestinal toxemia. The slightly stuporous condition, the irritability and the irregularity of the pulse are consistent with either condition. The absence of all physical signs of meningeal irritation, except the slight rigidity of the neck, is strongly against meningitis, but does not exclude it, because these symptoms are not infrequently lacking for several days, or even longer, after the onset. The chances seem very much in favor of intestinal toxemia, but there is enough to suggest meningitis to justify a lumbar puncture for diagnosis. This is a harmless procedure and, now that cerebrospinal meningitis can usually be cured by the antimeningitis serum, if it is administered early, should be done in every case in which there is a reasonable probability of meningitis. The sudden onset and rather rapid development of the stuporous condition suggest cerebrospinal rather than tubercular meningitis, but they are not inconsistent with the tubercular form at this age.

The fluid obtained by lumbar puncture was under high pressure and very turbid. A large fibrin clot formed on standing. The fluid contained 2,600 cells per cubic millimeter. So many of the cells were broken down that a differential count was impossible. There was, however, undoubtedly a large excess of polynuclear cells. Numerous Gram-decolorizing diplococci were seen within the cells. (See Case 72 for description of the normal cerebrospinal fluid and of the fluid in meningitis.) The results of the examination of the fluid obtained by lumbar puncture justify, of course, an absolute diagnosis of CEREBROSPINAL MENINGITIS.

Prognosis. The chances for recovery, if he is treated with the antimeningitis serum, are better than even, because it is less than forty-eight hours since the onset, the symptoms are comparatively mild and the organisms are all within the cells. This latter point shows that nature is making a fairly successful struggle against the infection.

Treatment. Another lumbar puncture must be performed as soon as the antimeningitis serum can be secured. All the

fluid that will run out must be allowed to escape. An equal amount of serum must then be introduced through the same needle, provided that 30 ccm. or more has run out. If less than that has been obtained, 30 ccm. must still be given, unless undue resistance is met in giving this amount. This, or a larger dose, according to the amount of fluid which escapes, must be repeated daily until no micro-organisms can be found in smears made from the fluid. If the temperature remains much elevated or the symptoms are not improving, the serum treatment must be continued even if the organisms have disappeared. Far better results are obtained from good-sized doses, frequently repeated, in the beginning, than from smaller doses or from the same or larger doses at longer intervals. Rigidity of the neck alone is not an indication for the continuance of the treatment, since rigidity often persists well into convalescence. No other treatment, except regulation of the bowels and of the diet, is indicated in this instance.

CASE 76. Timothy D., twelve years old, was the child of healthy parents. An uncle had died of pulmonary tuberculosis a year before. He had not lived with him, but had seen him repeatedly. He had always been well, except for an illness " similar to the present " a year before.

He began to be dizzy about August 26, but had no other symptoms except constipation. He was first seen by his physician September 2. The physical examination and the urine then showed nothing abnormal. His bowels were thoroughly cleaned out, but the dizziness persisted. September 6 he began to complain of stiffness in the neck and held his head turned to the right. Passive motions were, however, but little limited and did not cause pain. The pupils were equal and reacted to light. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. The neck was stiffer September 8 and he began to complain of pain in the neck. The pulse also became slow, running between 56 and 64. He began to vomit on the 9th and the rigidity and pain in the neck became much worse. The highest temperature up to the morning of the 9th was 99° F.; that morning it was 100° F. The constipation had persisted. He was seen in consultation at 4 P.M., September 9.

Physical Examination. He was well developed and nourished and of good color. He was perfectly conscious, but cried out occasionally from pain in the back of the neck. There was no retraction of the neck, but he held his head rigidly and turned to the right. All motions of the neck caused much pain. The neck sign could not be tested because of the rigidity. There was no enlargement of the cervical lymph nodes. The tongue was moderately coated; the throat normal. The pupils were equal and reacted both to light and accommodation. There was no strabismus. The membranæ tympanorum showed nothing abnormal. The heart and lungs were normal. The liver and spleen were not palpable. The abdomen was sunken, but not rigid. There was no spasm or paralysis of the extremities. The knee-jerks were equal and not exaggerated. The cremasteric and abdominal reflexes were present and not unusually lively. There was a marked Kernig's sign on both sides. Babinski's

sign was absent and there was no clonus. There was no disturbance of sensation. There was no eruption. The tâches cerebrales were marked. The mouth temperature was 100° F., the pulse 60.

Diagnosis. There can be no doubt, of course, that he has meningitis. The only question is whether it is tubercular or cerebrospinal. The known exposure to tuberculosis and the slow onset point strongly toward the tubercular form. There is nothing in the physical examination which is not consistent with either type. The absence of eruptions does not count at all against cerebrospinal meningitis since eruptions are far more often absent than present in this disease in childhood. It may be remarked in passing that the tâches cerebrales are of no importance in the diagnosis of meningitis, as they are present in all sorts of conditions in childhood. It is also worthy of mention that the abdomen, while often sunken from the lack of food, is almost never rigid in meningitis. In spite of the fact that the disease is almost certainly tubercular, a lumbar puncture should be done to make the diagnosis certain, because the fact that he has been exposed to tuberculosis does not prove that he has contracted it, and because the onset of cerebrospinal meningitis is sometimes slow and, if it is cerebrospinal meningitis, the serum treatment may save him.

A lumbar puncture was done at once and 45 ccm. of very turbid fluid under moderate pressure was allowed to run out. The marked turbidity of the fluid points very strongly to cerebrospinal meningitis (see Case 72 for description of the cerebrospinal fluid in health and disease), and much overbalances the points previously mentioned in favor of tubercular meningitis. It justifies a probable diagnosis of CEREBROSPINAL MENINGITIS and makes it obligatory to treat him on this basis without waiting for the results of the examination of the fluid.

Treatment. He should be given 45 ccm. of antimeningitis serum, which is equal to the amount of fluid withdrawn, through the same needle without withdrawing it. It is unwise to wait for the examination of the fluid, because the symptoms are marked and the earlier the serum is given the

more likely he is to recover. The serum can do no harm if the disease proves to be tubercular and, if it is cerebrospinal, considerable time is saved by not waiting for the examination. If the examination of the cerebrospinal fluid shows that the trouble really is cerebrospinal meningitis, this, or a larger dose, according to the amount of fluid which escapes, must be repeated daily until no micro-organisms can be found in smears made from the fluid. If the temperature remains much elevated or the symptoms are not improving, the serum treatment must be continued even if the organisms have disappeared. Rigidity of the neck alone is, however, not an indication for the continuance of the treatment, since rigidity not infrequently persists well into convalescence. The withdrawal of the fluid will probably relieve the headache. If it does not, an ice cap will probably help it.

The fluid which was withdrawn showed a small deposit of pus and a fibrin clot. Ninety-nine per cent of the cells were polynuclear and the diplococcus intracellularis was found both within and without the cells, thus verifying the diagnosis of cerebrospinal meningitis.

Prognosis. The prognosis in this instance is somewhat against recovery, because of the long duration of the illness before the beginning of treatment. The slow onset and the low temperature are, however, points in his favor.

CASE 77. Simon R., seven years old, was taken suddenly sick on the night of March 6 with pain in his head and moderate fever. He vomited several times during the first twenty-four hours, but not afterward. His bowels were opened freely with calomel the next day and had moved daily since then. The movements were loose, but otherwise normal. He had had no cough or nose-bleed. The pain in the head continued and the temperature gradually rose to 105° F. He was seen in consultation March 10.

Physical Examination. He was slight but muscular. His color was good. There was no eruption. He complained of pain all over his head, but of nothing else. He was perfectly rational. The pupils were equal and reacted to both light and accommodation. There was no strabismus or facial paralysis. The ear-drums were normal. The throat showed nothing abnormal. The tongue was dry and moderately coated. There was no tenderness or rigidity of the neck. The heart was normal. Percussion of the lungs showed nothing abnormal. The respiratory murmur and voice sounds were slightly diminished in the lower right back, but not changed in character. The level of the abdomen was below that of the thorax. The walls were lax and palpation was easy. There was no muscular spasm and no tenderness. The liver was not palpable. The upper border of the splenic dullness was on the eighth rib. The spleen was not palpable. There was no spasm or paralysis of the extremities. The knee-jerks were lively and equal. Kernig's and Babinski's signs were absent. Sensation to touch was normal. The cervical lymph nodes were slightly enlarged. The temperature by mouth was 105° F., the pulse 110, the respiration 28.

Diagnosis. Several diseases which it would have been necessary to consider at first, because of the acute onset, can now be ruled out on the duration of the illness and the absence of their typical symptoms and physical signs after four days. These are acute indigestion, malaria, scarlet fever, tonsillitis and otitis media. The other diseases which are suggested by the history are pneumonia, meningitis (more probably cerebrospinal than tubercular) and influenza.

The acute onset with vomiting and the continued high

temperature are very characteristic of pneumonia; the headache is not inconsistent with this diagnosis. Cough, while often absent for one or two days, almost always develops, however, by the fourth day. The physical signs in the lungs, namely, localized diminution of the respiratory murmur and voice sounds, are rather characteristic of pneumonia in an early stage and are often all that can be found for several days. Something more definite would, however, be expected by the fourth day. The pulse is slower than would be expected with a temperature of 105° F. in pneumonia, and the rate of the respiration is not increased out of proportion to that of the pulse. This latter point is an extremely important one and, when taken in connection with the indefiniteness of the symptoms and physical signs, is sufficient to rule out pneumonia.

The acute onset, the persistence of the headache and the relatively slow pulse and respiration suggest meningitis. The clear mind and the absence of all signs of meningeal irritation make it, however, extremely improbable. It is certainly not probable enough to justify a lumbar puncture for diagnosis.

The history and lack of physical signs are consistent with influenza. The duration of the illness without the development of any catarrhal symptoms, the relatively slight prostration and the comparatively slow pulse are, however, against it. Influenza seems a more reasonable diagnosis than the others, but is far from being satisfactory.

Is there any other disease which will explain the symptoms and physical signs better? There is, and that disease is typhoid fever. An acute onset is not unusual in typhoid in children. Nose-bleed is relatively infrequent at this age. A diffuse headache is characteristic of this disease. The spleen is enlarged (the normal upper limit of dullness is at the ninth rib). The relatively slow pulse (the normal rate at seven years is 90), without any symptoms of increased cerebral pressure or meningeal irritation, is almost pathognomonic. It is too early for rose spots, and abdominal symptoms are as often absent as present in typhoid at this age. A probable diagnosis of TYPHOID FEVER seems, therefore, justified.

There are several laboratory tests which may be tried

which will aid more or less in the diagnosis. Typhoid fever has no leucocytosis; neither has influenza. A white count will be, therefore, of no assistance in differentiating between these two diseases. A low white count will, in this instance, practically rule out pneumonia and cerebrospinal meningitis. Pneumonia, meningitis and typhoid all show the diazo-reaction; influenza does not. This test might, therefore, be of some assistance in differentiating between typhoid and influenza. It is too early to expect a positive Widal reaction, and it is hardly worth while to try it at present. A blood culture will almost certainly settle the diagnosis at once, as they are positive in about ninety per cent of all cases of typhoid at this stage.

Prognosis. The prognosis of typhoid fever at this age is very good. He is in good condition and his prognosis is at least as good as the average. The duration of the fever will probably not be over three weeks. There is very little chance of hemorrhage, practically none of perforation.

Treatment. He must, of course, be kept in bed. The author does not believe in a strict milk diet in this disease. It does not provide enough calories, is very monotonous and tends to cause constipation. He is very sure that patients who are fed more liberally are in better condition at the end of the disease and that they convalesce more rapidly. Broths and beef tea have almost no nutritive value, are likely to stir up peristalsis, and should consequently be given but sparingly. A suitable diet for this boy is as follows:

Milk, broth, beef tea, barley jelly, rice jelly, farina, milk toast, blanc mange, baked custard, junket, ice cream.

His fever will probably not require much treatment. If his temperature is constantly over 104° F., or he is depressed, or shows symptoms of disturbance of the nervous system as the result of the fever, it will require treatment. Sponge baths of alcohol and water, equal parts, at 90° F., every four hours, will probably be sufficient to control it. An ice-cap for the headache and suds enemata for constipation, if present, are all that are necessary at present in addition to regulation of the diet and baths.

CASE 78. Spencer S., eleven months old, was the only child of healthy parents. There had been no deaths or miscarriages and he had had no known exposure to tuberculosis. There was an epidemic of typhoid fever, caused by infected milk, in the Jamaica Plain district of Boston at the time when he was taken sick. He lived, however, in the West End. The milk which he took was bought at a store in the neighborhood, the proprietor of which said that none of his milk came from the Jamaica Plain dealers. He had not been away from home and there was no typhoid fever in the West End. His milk was not heated, he took unboiled water and was given a taste of almost everything on the table.

He vomited several times March 28, but not afterward. His appetite became poor and he had two or three green stools, containing much mucus, daily. Fever was first noticed March 30. He was drowsy most of the time and coughed occasionally. He was admitted to the Infants' Hospital, April 8.

Physical Examination. He was well developed and nourished and of good color. He was conscious, but drowsy. The anterior fontanelle was one cm. in diameter and somewhat depressed. There was no rigidity of the neck and no neck sign. The pupils were equal and reacted to light. The mouth and tongue were somewhat dry. The tongue was clean. The throat was normal. He had five teeth. There was a moderate rosary. The heart was normal. The lungs were normal, except for a moderate number of fine, moist râles in both backs. The level of the abdomen was that of the thorax. There was no spasm or tenderness and nothing abnormal was felt. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was palpable two cm. below the costal border. There were numerous light pink spots, about the size of a pin head, scattered over the abdomen. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and rather feeble. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 103.8° F.; the pulse, 138; the respiration, 36.

The urine was high-colored, clear, acid in reaction and contained no albumin or sugar.

The leucocytes numbered 11,000. No plasmodia malariæ were seen.

Diagnosis. The slight disturbance of the digestion, shown by the abnormal stools, does not seem sufficient to cause such marked constitutional symptoms or such a high temperature. Neither does the bronchitis seem severe enough to account for them. The absence of leucocytosis is, moreover, much against both bronchitis and a primary disturbance of digestion as the cause. The clean tongue is also against a primary disturbance of the digestion. It is evident that they are both secondary to some other disease. He is in good condition and of good color, the only manifestation of rickets is the rosary, and the liver is of normal size. The enlargement of the spleen is, therefore, undoubtedly a manifestation of the acute illness. The normal pulse-respiration ratio shows that he has not pneumonia. The points on which the diagnosis must be made are, then, an acute disease with a high temperature and with the pulse and respiration having the normal relation to the temperature and to each other, enlargement of the spleen, a macular rash on the abdomen and the absence of leucocytosis. Of the acute diseases not accompanied by leucocytosis, measles and mumps can be excluded by the absence of their characteristic signs, and malaria by the absence of plasmodia. Influenza can be ruled out on the enlargement of the spleen and the duration of the symptoms. Acute miliary tuberculosis is rendered improbable by the enlargement of the spleen, the rash, the relatively good general condition and the comparatively slight acceleration of the pulse and respiration. The enlargement of the spleen and the rash are more consistent with typhoid fever than with any other condition. The drowsiness is also characteristic of typhoid. The acute onset and the absence of nosebleed do not count against typhoid, because an acute onset is the rule in typhoid in infancy and nosebleed is unusual. The pulse rate is perhaps increased a little more, relatively to the temperature, than would be expected in typhoid. In infancy, however, the increase is, as a rule, relatively greater

than in older children and adults. The pulse rate does not count, therefore, against typhoid. Bronchitis is very common in typhoid fever in early life. Its presence in this instance is corroborative evidence in favor of typhoid. The diagnosis of TYPHOID FEVER is, therefore, a reasonably certain one. A Widal test should be tried. This being the eleventh day of the illness, it should be positive, if the trouble really is typhoid. The presence of an epidemic of typhoid in the city is of interest but, in the absence of any apparent exposure, of but little aid in diagnosis.

Prognosis. Typhoid fever, while a comparatively mild disease in childhood, is a more serious matter in infancy and is often fatal. He is in good condition, however, has no complications, has already been ill eleven days, which is at least one-half the usual duration of typhoid in infancy and early childhood, and may, therefore, be confidently expected to recover. The temperature will probably fall to normal by a rapid lysis, without marked remissions, in the course of about ten days.

Treatment. He should be given seven feedings of six ounces of a mixture containing 2.50% of fat, 7% of sugar, 1.50% of proteids and 0.75% of starch. There is no indication for the addition of an alkali. He should also be given sixteen ounces or more of water during the twenty-four hours. He is not depressed by the fever and shows no symptoms of disturbance of the nervous system. No treatment is necessary, therefore, for the fever. There is no indication for the administration of drugs.

CASE 79. Mary L., six years old, was the third child of healthy parents. The other children were alive and well. Her mother had had, however, two miscarriages. There was no history of tuberculosis in either family or of exposure to it. She had had no illnesses, but had been thin and delicate during the last two years.

She began to complain, late in the afternoon of September 1, of headache, fever and general malaise. These symptoms persisted. Her appetite was poor and she vomited considerable dark-brownish, frothy material several times during the next two days. She was given Castoria the first night, had four loose, yellowish-brown movements on September 2 and eight or nine watery, green movements on each of the two succeeding days. She had the nosebleed September 5. The next day she began to complain of general abdominal pain and to hold her right thigh flexed. She was admitted to the Children's Hospital, September 7. Her bowels had moved freely that morning after an enema.

Physical Examination. She was poorly developed and nourished and moderately pale. She was irritable, restless, hyperesthetic and at times slightly delirious, so that but little reliance could be placed on her statements as to pain. Her face was a little anxious. The pupils were equal and reacted to light. There was no rigidity of the neck or neck sign. Her tongue was moist and covered with a heavy white coat. The throat, heart and lungs were normal. The liver and spleen were not palpable. The liver flatness extended to the costal border. The upper border of splenic dullness was on the ninth rib. The abdomen was slightly distended and everywhere tympanitic. There was moderate general tenderness, somewhat more marked in the right lower quadrant than elsewhere. An irregularly shaped, moderately moveable mass, about three cm. wide and eight cm. long and moderately tender, was felt in the neighborhood of McBurney's point. There was definite muscular spasm in this region. There were no evidences of fluid in the abdomen. The right thigh was held about three-quarters flexed on the abdomen and extension caused pain. The knee-jerks were equal and slightly increased. Kernig's sign was absent on the left and could not be determined on the right

because of the pain. There was no enlargement of the peripheral lymph nodes. Rectal examination showed bulging and resistance on the right. There was no eruption. The rectal temperature was 105.5° F.; the pulse, 128; the respiration, 30.

The urine was high-colored, acid in reaction, of a specific gravity of 1015, and contained a trace of albumin, but no sugar. The sediment showed nothing but a few small round and squamous cells.

The leucocytes numbered 13,400.

The Widal test was negative.

Diagnosis. The diagnosis in this instance lies between tubercular peritonitis, appendicitis and enlargement of the mesenteric lymph nodes, presumably as a complication of typhoid fever. Abdominal pain, tumor, muscular spasm and tenderness and resistance on the right on rectal examination are symptoms common to all these diseases and are, therefore, of little importance in differential diagnosis. The flexion of the thigh is a secondary symptom and unimportant. The onset is not characteristic of any of them and can, therefore, be disregarded. The history of failing health for two years is suggestive of a tubercular infection, but, although making tubercular peritonitis a little more probable, is of comparatively little importance. The mobility of the tumor is much against appendicitis, but perfectly consistent with tubercular peritonitis and enlargement of the mesenteric lymph nodes in typhoid. The increase in the number of white cells, although somewhat unusual in tubercular peritonitis, is not inconsistent with it, while it is not great enough to count much against typhoid fever. It counts materially against appendicitis, however, because the white count in this disease is high unless the system is overwhelmed by the toxemia, and in this instance the other symptoms show that this is not the case. The temperature is higher than would be expected in tubercular peritonitis or appendicitis, but, while more characteristic of typhoid, is not inconsistent with either condition. The increase in the rate of the pulse is much less than would be expected in tubercular peritonitis and appendicitis, when the height of the temperature is taken into consideration. A relatively slow

pulse is, however, characteristic of typhoid fever and is strong evidence in favor of this disease. The nosebleed points somewhat toward typhoid. The absence of enlargement of the spleen and of rose spots and the negative Widal test do not count at all against it at this stage. It is possible, therefore, to rule out appendicitis on the mobility of the tumor, the relatively slight leucocytosis in connection with the fairly good general condition and the relatively slow pulse. It is more difficult to exclude tubercular peritonitis, but the relatively slow pulse is much against it. There is nothing inconsistent with enlargement of the mesenteric glands in typhoid fever, except the leucocytosis. This is so slight, however, that it is not sufficient to rule it out. There are, moreover, a number of points in favor of typhoid fever. The most important of them is the relatively slow pulse. Less important are the nosebleed and the fact that the temperature is higher and the nervous symptoms more severe than would be expected from the local conditions in the abdomen. An almost positive diagnosis of TYPHOID FEVER WITH ENLARGEMENT OF THE MESENTERIC GLANDS is, therefore, justified. A blood culture ought to be made to verify the diagnosis, as at this time it will almost certainly be positive if the disease is typhoid fever. A skin tuberculin test will not be of much assistance. A negative result may mean either the absence of tuberculosis or an overwhelming infection with tuberculosis, while a positive result merely shows that there is tuberculosis somewhere, not that the present trouble is tuberculosis.

Prognosis. Her temperature is high and the nervous symptoms are moderately severe. A high temperature and marked nervous symptoms are, however, of less significance in the child than in the adult. Her heart is strong, her lungs are clear, the pulse is not unduly rapid, the mortality from typhoid fever in early life is very low, the enlargement of the mesenteric lymph nodes does not increase the gravity of the illness. She may, therefore, be confidently expected to recover.

Treatment. The enlargement of the lymph nodes calls for no especial treatment. The general management of typhoid fever in childhood is described in Case 77.

CASE 80. Althea P., five and one-half months old, was the only child of healthy parents and had always been perfectly well. There had been no miscarriages. Her father had had a severe " cold " in his throat and nose about two weeks before. She had had a " cold in the nose " for a week, but had not appeared sick or feverish. She had taken the breast well up to the last two days. The discharge had irritated the upper lip a little. There had been no other symptoms.

Physical Examination. She was well developed and nourished and of good color. The anterior fontanelle was 3 cm. in diameter and level. She showed a slight tendency to keep her mouth open. There was a small amount of thin, watery discharge from the nose which irritated the upper lip. The turbinates were a little swollen and reddened and had a few crusts on them. No membrane was seen. The throat was perfectly normal. There was no rosary. The heart and lungs were normal. The level of the abdomen was that of the thorax. It showed nothing abnormal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no enlargement of the peripheral lymph nodes The rectal temperature was 99.2° F.

Diagnosis. Syphilitic rhinitis can be at once excluded on the good family history, the previous good health, the good general condition, the history of exposure to her father's " cold " and the absence of all other signs of syphilis. The only thing to suggest diphtheritic rhinitis is the persistence of a watery discharge which irritates the upper lip. The absence of constitutional symptoms, fever and enlargement of the cervical lymph nodes does not count at all against diphtheritic rhinitis, because a persistent, irritating, nasal discharge without other symptoms is most characteristic of this disease in infancy. The chances are, of course, much in favor of a simple rhinitis, but the watery, irritating character of the discharge is suspicious enough to demand a bacteriological examination. This was made and an almost pure culture of the Klebs-Loeffler bacillus was found, justifying

the suspicion of DIPHTHERITIC RHINITIS. The presumption is that her father had had diphtheria and that she had caught it from him.

Prognosis. The prognosis is perfectly good. Extension of the process is very unusual, even if it is untreated. The chief danger is of infection of those about her.

Treatment. The treatment is the administration of the antitoxin of diphtheria. Fifteen hundred units, repeated in two days, will probably be sufficient; more must be given if the discharge persists. Local treatment is hardly necessary, but some simple alkaline solution, dropped in the nose with a medicine dropper, every few hours, will probably make her more comfortable. She must be isolated until two consecutive negative cultures have been obtained from both the nose and throat.

CASE 81. Martin S., six years old, began to have a loud, ringing cough with slight difficulty in breathing during the night of May 23. The cough and difficult respiration continued without diminution during the 24th. That night the difficulty in respiration increased considerably, so that he slept but little. He was no better on the morning of the 25th and was not able to talk aloud. During the day the difficulty in breathing increased very rapidly, so that he had to sit up to breathe. He became cyanotic and was unable to take nourishment. His temperature during these days had ranged from normal to 101° F. Repeated examinations of the throat had shown nothing abnormal. He was seen in consultation at 7.30 P.M., May 25.

Physical Examination. He was a large, strong boy. He was markedly cyanotic and was sitting up in bed with his head stretched forward. The inspiration was noisy. The cough was harsh and dry. He was unable to speak above a whisper. The cervical lymph nodes were slightly enlarged. The tonsils were moderately enlarged and somewhat reddened, but there was no exudation upon them. There was no nasal discharge. There was sinking in of the supraclavicular spaces, of the lower intercostal spaces and of the epigastrium with each inspiration. Percussion of the lungs was normal. The respiratory murmur was very feeble, but not abnormal in character. Very many loud, medium and coarse, moist râles were heard over both chests. The râles were alike in both chests and both behind and in front. There was nothing abnormal about the heart except the rapidity of its action. The abdomen was normal. The liver and spleen were not palpable. The extremities were not examined. The axillary temperature was 101° F., the pulse 150, the respiration 24.

Diagnosis. The cyanosis and the retraction of the epigastrium, intercostal and supraclavicular spaces are simply manifestations of some obstruction to the entrance of air into the lungs and do not indicate where the obstruction is located. The head is stretched forward in order to make breathing easier by straightening the upper air passages. The normal condition of the nose and throat rules out obstruction above the larynx. The signs in the lungs are not

sufficient to account for so much cyanosis and retraction. The fact that the râles are alike in both chests, both back and front, shows, moreover, that they are not made in the bronchi, but transmitted from above. The relatively low rate of the respiration also shows that the trouble in the lungs is not the cause of the cyanosis and retraction. The obstruction must, therefore, be situated in the larynx. The noisy inspiration, the harsh dry cough and the whispering are all characteristic of inflammation of the larynx and corroborative of the diagnosis of laryngeal obstruction.

The next point to be determined is whether the trouble in the larynx is catarrhal or diphtheritic. The progressive increase in the difficulty in respiration is almost pathognomonic of laryngeal diphtheria and entirely different from the course of catarrhal laryngitis, in which the obstruction is not continuous and progressive, but occurs in paroxysms, being worse at night than during the day. The progressive increase in the symptoms is of itself sufficient to justify the diagnosis of LARYNGEAL DIPHTHERIA. The slight degree of the fever is consistent with either condition, but is more characteristic of laryngeal diphtheria than of catarrhal laryngitis, in which the temperature is usually higher. The absence of marked inflammation of the throat and of enlargement of the cervical lymph nodes does not count at all against laryngeal diphtheria because in primary laryngeal diphtheria the throat is usually not involved and, as there is but little absorption from the larynx, the lymph nodes are not enlarged. It would be criminal, in this instance, to await bacteriological verification of the diagnosis. A negative culture, if taken from the throat, would not, in fact, invalidate the diagnosis of laryngeal diphtheria, because the diphtheria bacilli are often absent from the throat when the diphtheritic process begins in the larynx.

Prognosis. The prognosis is practically hopeless without intubation, and very grave with intubation unless antitoxin is given freely. With intubation and antitoxin the chances are in his favor, because he is in good general condition, there is no involvement of the throat, practically no septic absorption and his heart is strong.

Treatment. Intubation should be done at once. He should be given six thousand units of antitoxin as soon as he has quieted down after the intubation. This dose should be repeated in eight hours. It is impossible to state in advance whether he will need more or not. If his temperature drops to normal and the general condition remains good, it will probably not be necessary to repeat it. If he coughs up the tube and the obstruction does not return, further doses will not be needed; otherwise, the antitoxin must be continued, perhaps in larger doses. The tube should be removed on the third or fourth day. If the obstruction recurs it must be replaced. It is far wiser to have some one competent to remove and replace the tube in the house as long as the tube is in the larynx than to leave him alone, because emergencies, such as blocking of the tube and coughing up the tube, are liable to occur at any time and, if not met immediately, are likely to prove fatal.

The food should be milk and soft solids, like junket, baked custard, ice cream, soft cereals and soft toast. Some children take liquids better; some, soft solids. It is impossible to tell in advance which he will take better. Most children take their food best sitting up. It is wiser, therefore, to try him first in this position. If he has trouble in taking it in this way he may be able to take it better lying on his back with his head lower than his body. If he has much difficulty in taking food, it is safer to feed him with a tube introduced through the mouth than to persist with other methods. No other treatment is indicated at present.

CASE 82. Isabelle C., eight years old, had had measles but not scarlet fever. She had been perfectly well during the last six months. She slept well the night of November 16, ate her usual breakfast, had a normal movement of the bowels and went to school apparently in good health. Soon after reaching school she began to have a rather severe headache, but said nothing about it. When her father went after her at noon, he found her very feverish and having a chill. She was a little nauseated, complained of headache and was very nervous and excited. She was seen at 3 P.M.

Physical Examination. She was well developed and nourished and in good general condition. She was very nervous and much excited. She complained of feeling cold and of headache. The headache was general, not localized. She was generally hyperesthetic. There was no rigidity or tenderness of the neck. The pupils were equal and reacted to light. The throat was normal. The tongue was slightly coated. The membranæ tympanorum were normal. The heart and lungs were normal. The liver and spleen were not palpable. The level of the abdomen was that of the thorax; nothing abnormal could be detected in it. There was no spasm or paralysis. The knee-jerks were equal and normal; Kernig's and Babinski's as well as the neck sign were absent. There was no enlargement of the peripheral lymph nodes and no eruption. The temperature, by mouth, was 102.8° F., the pulse 120, the respiration 35.

The urine was high in color, acid in reaction, of a specific gravity of 1,024, and contained no albumin or sugar.

The leucocytes numbered 8,100. No plasmodia were seen.

Diagnosis. This onset is consistent with that of almost any of the acute diseases. Certain of them are, however, much more probable than the others. These are scarlet fever, tonsillitis, influenza and pneumonia.

Malaria is unlikely in November, and in Boston. It is excluded by the absence of plasmodia in the blood. The acute onset with headache suggests, to a certain extent, meningitis. The hyperesthesia is also rather suggestive. The headache and hyperesthesia are, however, equally well explained by the temperature. An onset as acute as this is

very unusual in tubercular meningitis at this age. The absence of all signs of meningeal irritation is also against meningitis in any form. The low white count practically rules out cerebrospinal meningitis. The absence of sore throat at this time, only a few hours after the onset, does not, of course, rule out scarlet fever and tonsillitis, but makes them somewhat improbable. Neither a rash nor signs in the lungs can be expected thus early. The relatively greater increase in the rate of the respiration over that of the pulse suggests pneumonia, but it is hardly marked enough to be of much importance. There is nothing about the onset and symptoms inconsistent with influenza, and the absence of physical signs is entirely consistent with this disease. The leucocyte count is of great assistance in this instance. The low count practically rules out scarlet fever, tonsillitis and pneumonia, all of which have a marked leucocytosis, and is characteristic of influenza, the only other condition to be seriously considered. The diagnosis of INFLUENZA seems, therefore, justified.

Prognosis. There is, naturally, no danger as to life. The fever will probably not last many days and she will be able to return to school in a week or ten days.

Treatment. The treatment is simple; a tablespoonful of castor oil, laxol or syrup of senna, to empty the bowels; a diet of milk, broth and simple starchy foods; an ice-cap for the headache; phenacetin and salol, 2½ grains each, every three hours, for the headache and general discomfort.

CASE 83. Leonard O., nineteen months old, had always been well. He was in Windham, Conn., on a visit from September 27 to October 4. He was well while there but was severely bitten by mosquitoes. Although the weather was cool and he had eaten nothing unusual, he began to have loose movements of the bowels October 17. He continued to have four or five loose, greenish movements, without curds or mucus, daily. His appetite was poor, but he did not vomit. He was feverish and sick all day on the 17th, but, aside from the loose movements, had no very definite symptoms. He was fairly well on the 18th, but was worse again on the 19th. When he woke in the morning of the 21st he was cold and rather blue and his face looked pinched. Heaters were applied and brandy given, and after a few hours he became warm again. He then seemed a good deal relaxed, sweat quite freely and was depressed all day. He was seen October 22. He then appeared fairly well, but was quiet and looked run down.

Physical Examination. He was well developed and nourished, but rather flabby. Pallor was marked. He had twelve teeth. The anterior fontanelle was not quite closed. The tongue was clean and the throat normal. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 3 cm., and the spleen 1 cm., below the costal border. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was normal. A movement which was seen was watery, black (presumably from bismuth) and foul, but contained no curds or mucus. The urine was pale, slightly acid in reaction, of a specific gravity of 1,012 and contained no albumin.

Diagnosis. The periodic increase in the severity of the symptoms ought at once to suggest the possibility of malaria, in spite of the persistance of the diarrhea. The peculiar condition on waking on the 21st, taken in connection with the subsequent sweating and depression, makes this diagnosis very probable. In fact, this combination is very characteristic of the malarial paroxysm in infancy, at which age the

chill is usually replaced by cyanosis and cold extremities. The sweating in this instance was, however, more pronounced than is usual. The marked pallor and the enlargement of the spleen are further corroborative evidence. A slight enlargement of the spleen, as in this instance, is, however, not very uncommon in many acute infections in infancy. The enlargement may, moreover, be a chronic one due to the same disturbance of nutrition in the past which caused the rickets, the results of which are shown in the open fontanelle, the slightly delayed dentition and the rosary. Further evidences in favor of malaria are the stay in a malarial district and the fact that he was bitten by mosquitoes. The time between the possible infection and the development of the symptoms corresponds, moreover, to the average incubation period of malaria. The diagnosis of MALARIA is, therefore, justified. This diagnosis should, however, never be made positively without an examination of the blood. The blood was examined in this instance and a single infection with the tertian organism found.

Prognosis. The prognosis is, of course, good. Malaria in infancy usually yields very promptly to treatment.

Treatment. The treatment is, of course, the administration of quinine. The same rules apply to its use in infancy as in later life. Babies will usually take the sulphate of quinine in solution by mouth without difficulty and without vomiting. If it is vomited it may be given in a suppository. It is rarely necessary to give it subcutaneously. This boy should have 2 grains of the sulphate of quinine by mouth, or $2\frac{1}{2}$ grains by rectum, in the late evening of the 22d, 24th, 26th and 28th. He ought not to have any paroxysms after the first two doses and, theoretically, should be cured by the four doses. In order to be doubly safe, however, it will be well to give him 1 grain of sulphate of quinine twice daily for two days, four times, at intervals of a week. The saccharated carbonate of iron, in doses of 3 grains, three times daily, after eating, will help the anemia. The loose movements are a symptom of the malaria and will cease with the cure of this condition.

CASE 84. Ruth A., three and one-half years old, had always been well, except for an attack of chicken-pox a year previously. She became a little feverish and began to complain of pain in the left wrist during the afternoon of March 9. Her temperature that night was 100.5° F. Nothing abnormal was detected about the arm. There was no history of any injury. The next morning the temperature was 102.5° F. and there was more pain and some tenderness, but no heat or redness, in the wrist. From this time on the temperature and the pulse-rate rose steadily and the pain became very severe. Aspirin, in fairly large doses, had had no effect on either the pain or the temperature. She had had no chills and had not vomited. She was seen in consultation late in the afternoon of March 11, forty-eight hours after the onset.

Physical Examination. She was well developed and nourished and of good color. She was actively delirious but, when roused, answered rationally. There was no rigidity or tenderness of the neck and no neck sign. The pupils were equal and reacted to light. The throat was normal, the tongue moderately coated. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal, except for the left arm. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. The lymph nodes in the left axilla were slightly enlarged and tender; the other peripheral lymph nodes were not palpable. There was considerable deep swelling in the upper two thirds of the left forearm with moderate tenderness on pressure, more marked over the radius than over the ulna. There was no redness, but some heat. There was also a little swelling about the elbow-joint and in the lower portion of the upper arm. There was no tenderness over the elbow-joint and no evidences of effusion into the joint. Passive motions were slightly limited at the elbow, but not at the wrist. The rectal temperature was 104° F., the pulse 160.

Diagnosis. The diagnosis is not a difficult one. Scurvy can be ruled out by the age of the child, the acuteness of the onset, the high temperature and the localization of the process

in one extremity. Rheumatism is unusual at this age and, as a rule, its symptoms are mild. If they are severe, they are located in the joints, not in or about the shafts of the bones, and several joints are involved at once. Inflammation of the superficial tissues can be ruled out by the absence of redness and the deepness of the swelling. The trouble must, therefore, be located in or about the shafts of the bones, that is, it is an osteomyelitis or a periosteitis. It is unimportant for practical purposes whether it is a periosteitis, an osteomyelitis or both, for in any case an immediate operation is necessary. The swelling shows that there is certainly a PERIOSTEITIS. In all probability there is an OSTEOMYELITIS also, although the absence of extreme localized tenderness is somewhat against it.

Prognosis. The prognosis is very grave. The chances are much against recovery even with an immediate operation.

Treatment. The treatment is immediate operation.

CASE 85. Lillian H. was nine months old. Her parents were well. Two children had died of "cholera infantum" and there had been one miscarriage. She was born at full term, after a normal labor, was normal at birth and weighed six pounds. She was nursed for a month, after which she was given modified milk for a month. This did not agree with her and she was put on a mixture of two teaspoonfuls of condensed milk in eight ounces of water, which was given to her whenever she cried. Her digestion had been all right since starting the condensed milk and she had gained weight fairly well. Swelling and tenderness of the right arm was noticed one week and swelling of the left leg three days before her admission to the Infants' Hospital. The swelling of both arm and leg had increased. They had apparently caused considerable pain and had interfered with her sleep. She had been feverish, but the temperature had not been taken.

Physical Examination. She was fairly developed and nourished, and of fair color. The anterior fontanelle was one cm. in diameter. The tongue was moderately coated. There were two teeth. The gums were healthy about them. There was an ulcerated area in the median line, at the junction of the hard and soft palates, about one-half an inch long and one-quarter of an inch wide, with a small superficial ulceration on each side of the soft palate. The throat, heart and lungs were normal. The abdomen was large and lax, but otherwise normal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The left arm was normal. There was marked swelling of the right hand and forearm up to the elbow. The skin was tense and shiny and, about the wrist, very red, while in the upper portion it was brawny. This swelling was exquisitely tender. Motions at the elbow were free and caused but little pain. There was no motion at the wrist, but the fingers could be moved a little. She lay with the thighs flexed on the abdomen and the legs flexed on the thighs. The right leg, however, was normal in every way. There was swelling, redness and heat over the upper portion of the left leg. Motions at the knee caused pain, but were not limited. Motions at the hip and

ankle were normal. The rectal temperature was 103° F.; the pulse, 160; the respiration, 50.

The leucocyte count was 48,000.

Diagnosis. The fact that she has taken nothing but condensed milk for seven months, the pain, tenderness and swelling in the extremities and the position of the legs suggest scurvy. The high temperature, the normal condition of the gums, the asymmetrical distribution of the swellings, the presence of redness and heat, and the leucocytosis are, however, sufficient to rule out this disease. The onset is more acute and the superficial evidences of inflammation are more marked than is usual in tuberculosis, the swelling involves the shafts of the bones rather than the joints and two extremities are involved at the same time. Syphilis is suggested by the ulcerations in the mouth. They are, however, not manifestations of syphilis but simply the result of abrasion of the mucous membrane and constitute the condition known as BEDNAR'S APHTHÆ. There are no other evidences of syphilis, the temperature is high and the inflammation is acute. Tuberculosis and syphilis can, therefore, be excluded. The leucocytosis, moreover, is much against both of these conditions and shows that there is some acute inflammatory condition. It is impossible to tell from the examination whether the lesions involve the bones of the forearm and leg and the wrist joint as well as the periosteum, but, as in most cases of inflammation of the bones and joints in infancy the original focus is in the bones and extends into the joint and to the periosteum, the chances are that in this instance there is a PERIOSTEITIS and an OSTEOMYELITIS OF THE RADIUS, with purulent inflammation of the wrist joint, and a PERIOSTEITIS and OSTEOMYELITIS OF THE TIBIA.

Prognosis. The condition is a very serious one. She is almost certain to die within a few days of general sepsis, unless she is operated upon immediately. If she is, there is a fair chance of her recovery.

Treatment. The treatment is immediate operation. If periosteitis is found, the bone should be investigated and the medullary canal opened, if necessary. If there is a purulent inflammation of the joint, it should be freely opened.

CASE 86. John D. was the second child. The first child was born dead at eight months. There had been no other pregnancies. His mother had had no symptoms of syphilis; his father was not seen.

He was born at full term after a normal labor and was normal at birth. Dryness of the palms and soles and cracking of the lips was noticed when he was two weeks old. A week later he began to have trouble in breathing through his nose and kept his mouth open. The trouble in breathing steadily increased, and when he was four and a half weeks old he began to have great difficulty in nursing. He did not vomit. The movements from the bowels were normal. He had had no fever. He was seen in consultation when five weeks old.

Physical Examination. He was small but well-nourished. There was slight cyanosis of the lips and extremities. The anterior fontanelle was 3 cm. in diameter and slightly depressed. The posterior fontanelle was not quite closed. The pupils were equal and reacted to light. There was no strabismus. There was a slight purulent discharge from the left eye. He lay with his head held back. The neck was, however, freely moveable. His mouth was open and no air entered through the nose. His breathing was irregular, difficult and rapid. There was a slight purulent discharge from one nostril. The nasal mucous membrane was much swollen, but no membrane was visible. A probe could be passed through both nostrils, but with considerable difficulty; its passage caused bleeding. Examination with forceps by a nose and throat specialist showed no adenoid growth. There was nothing abnormal in the pharynx or in the region of the tongue. The lips were cracked. There was retraction of the epigastrium with inspiration. The heart and lungs were normal, except that at times no respiratory sound could be heard. The cry was strong and of normal character, when he had breath enough to cry. The abdomen was negative. There was no enlargement of the liver or spleen. The genitals were normal. There were no mucous patches about the anus. The extremities were normal except for redness, thickening and scaling of the palms and soles. There was no spasm or paralysis of the face or of the extremities. The knee-jerks

were equal and normal. Kernig's sign was absent. There was a fine desquamation over the whole body, but no eruption or scars of any old eruption. The rectal temperature was 104° F.; the pulse 160, but fairly strong. The baby seemed a good deal exhausted.

Diagnosis. The purulent discharge from the eye is an incidental and unimportant complication. The retraction of the epigastrium with inspiration shows that there is an obstruction to the entrance of air somewhere in the respiratory tract, but gives no hint as to the location of the obstruction. The cyanosis has the same significance. The clear, strong cry rules out any obstruction in the larynx. The high temperature and rapid respiration suggest some pathological condition in the lungs. The character of the respiration and the absence of physical signs in the lungs rule this out, however, and the temperature can be explained equally well by toxic absorption from the nose and exhaustion. The negative examination of the throat rules out obstruction from adenoids, retropharyngeal abscess or malformation. The obstruction to the entrance of air must, therefore, be located in the nose. The reason that the baby is so much troubled by this obstruction is that he has not yet learned to breathe through his mouth, and that it prevents him from getting sufficient nourishment. It is the nasal obstruction which is causing the serious symptoms in this instance, and it is this condition which must be relieved in order to save the baby's life. The retraction of the head is not a sign of meningitis, but merely the result of the baby's effort to get more air by straightening the upper air passages.

The possible causes of the nasal obstruction in this instance are simple rhinitis, diphtheritic rhinitis and syphilitic rhinitis. Any one of them, even the simple rhinitis, can, at this age, cause symptoms as serious as those present in this instance. Both simple and diphtheritic rhinitis usually have more discharge than there is in this instance, and the discharge in nasal diphtheria is usually thin and irritating. The absence of visible membrane does not rule out nasal diphtheria, because it is often absent or out of sight in this disease. While, however, there is nothing about the symptoms or local con-

ditions to exclude simple or diphtheritic rhinitis, there is much in the history and physical examination which points toward syphilitic rhinitis. The previous stillbirth, the appearance of dryness of the palms and soles and cracking of the lips at two weeks and of nasal obstruction at three weeks, and the redness, thickening and scaling of the palms and soles, while individually not of much importance, together make the diagnosis of SYPHILITIC RHINITIS practically certain. The good health of the mother does not, of course, count in any way against the diagnosis of syphilis, because syphilis is often transmitted from father to child, although the mother shows no signs of the disease.

Prognosis. The prognosis is very grave, because the cause of the obstruction, the syphilis, cannot be removed at once and it is doubtful whether the nasal obstruction can be relieved by local treatment for so long a time as will be required to get the syphilis under control. A point in his favor is that he is nursed.

Treatment. The specific treatment of the syphilis must, of course, be begun at once. The local treatment of the nasal obstruction is, however, of more immediate importance and, next to this, the administration of food. A 1-5,000 solution of adrenalin chloride is more likely to relieve the nasal obstruction than anything else. This is best applied by dropping it into the nose with a medicine dropper while the baby is lying on its back, so that it can run downward over the nasal mucosa. Five drops in each nostril every hour should be sufficient. If it is not effective in this strength, it is hardly worth while to try stronger solutions. If it does not give relief, a 0.5% solution of cocaine may be tried. This must be used cautiously, as babies are very easily poisoned by cocaine. If these measures are unsuccessful, pieces of rubber tube (a catheter is suitable), as large as can be passed into the nose and long enough to reach the pharynx, may be inserted into both nostrils.

If the nasal obstruction is relieved by these procedures the baby will probably be able to take the breast. If he is not, the milk must be withdrawn with a breast pump or squeezed out by hand and given to him with a dropper or a Breck

feeder, or through a stomach-tube passed through the mouth. He ought to get at least sixteen ounces in the twenty-four hours; twenty ounces if possible.

A piece of mercury ointment, half the strength of the officinal unguentum hydrargyrum, the size of a large pea, should be rubbed in daily, the location of the application varying from day to day. This should be continued, with occasional short interruptions, for a year. It must be remembered in this connection that the earliest symptom of mercurial poisoning in infancy is diarrhea, not salivation. It should then be used, as a matter of precaution, one month in every three for three or four years and, even if there are no symptoms, again for a couple of years at the time of the second dentition, and at puberty.

CASE 87. John N. was the only child. His parents said that they were and always had been well. There had been one previous miscarriage. He was born at full term, after a normal labor, and was normal at birth. He had never had anything but breast-milk, but had been nursed very irregularly. He often vomited immediately after nursing and had from two to six yellowish-green movements, containing small curds, daily. His mother said that he had moved his legs and arms freely until he was two weeks old, since when he had gradually stopped using them, so that now he almost never moved them. He began to scream with pain whenever his arms and legs were handled, when he was about four weeks old. A nasal discharge appeared when he was three weeks old and had persisted. He had apparently had no fever and had, she thought, gained in weight. The urine had not stained the diapers. He was seen at the Infants' Hospital when two months old.

Physical Examination. He was fairly developed and nourished, but a little pale. The head was of good shape. The anterior fontanelle was one and one-half cm. in diameter and level. There was no rigidity of the neck. The pupils were equal and reacted to light. The mouth and lips were healthy. There was an irritating, watery discharge, mixed with blood, from the nostrils, which were somewhat obstructed. A bacteriological examination of this discharge showed no Klebs-Lœffler bacilli. There was no rosary. The heart and lungs were normal. There was a small umbilical hernia. The abdomen was otherwise normal. The lower border of the liver was palpable three cm. below the costal border in the nipple line. The spleen was palpable one and one-half cm. below the costal border. There was no enlargement of the peripheral lymph nodes. The anus and genitals were normal. He held his arms closely to his sides, flexed to about a right angle at the elbow and with the hands sharply flexed at the wrists and turned to the ulnar side. The fingers and thumbs were flexed at the metacarpophalangeal and extended at the phalangeal joints. He was able to make all motions with his arms and hands, but they caused pain. Passive motions were not limited, but caused

much pain. There was considerable swelling at the wrists at the level of the epiphyseal line and for a short distance above it. There was also a bony swelling in the upper third of the left forearm. These swellings were tender, but not red or hot. He held his thighs partially flexed on the abdomen with the legs flexed at the knees to about a right angle. He could make all motions with his legs, but they were considerably limited. Passive motions were also limited and caused much pain. There was considerable swelling at the ankles at the level of the epiphyseal line and for some distance above it, as well as of the lower portion of the right femur. These swellings were very tender, but not red or hot. The knee-jerks and Kernig's sign could not be determined, because of the spasm.

The rectal temperature was 100° F.; the pulse, 120; the respiration, 30.

The urine was pale, clear, acid in reaction, and contained no albumin.

Diagnosis. Peripheral neuritis can be excluded on the age of the child, the absence of cause, the spasm of the extremities and the presence of the swellings. Spastic diplegia can be ruled out on the tenderness and swelling. Scurvy, which is strongly suggested by the tenderness and swelling of the bones, is rendered very improbable by the age of the child and the fact that it has never had anything but breast-milk. The location of the swellings is, moreover, not quite that of the swellings in scurvy, which are situated over the diaphysis and do not extend over the epiphyseal line. The age of the baby, the absence of a rosary and the presence of pain and tenderness exclude rickets. The history of gradually increasing unwillingness to use the extremities, beginning at two weeks in a baby previously normal, accompanied by pain, tenderness and swelling in the extremities, is very characteristic of the acute epiphysitis of congenital syphilis. So is the location of the swellings. The position of the extremities is that usually assumed in this condition. The previous miscarriage, the bloody, irritating nasal discharge and the enlargement of the spleen are corroborative evidence in favor of this diagnosis. In fact, these things, when taken

together, make the diagnosis of SYPHILITIC EPIPHYSITIS, or Parrot's syphilitic pseudoparalysis, unquestionable. The thickening and irregularity at the epiphyseal lines at the wrists and ankles, shown in the radiographs taken at this time, confirmed this diagnosis, as did the positive Wasserman test which was obtained from the blood a few days later.

Prognosis. The prognosis of this condition, when properly treated, is very good. Even if separation of the epiphyses has occurred, reunion always takes place and usually without any deformity.

Treatment. A piece of mercury ointment, one-half the strength of the officinal unguentum hydrargyrum, the size of a large pea, should be rubbed in daily, the location of the application varying from day to day. (See Case 86.) He should be kept on the breast, but should be nursed regularly, being given eight feedings in twenty-four hours, at two and one-half hour intervals. Boracic acid ointment should be applied to the upper lip and liquid albolene dropped in the nose every few hours.

CASE 88. Kenneth B. was admitted to the Children's Hospital when six years old. He was the only child. His mother had had, however, two miscarriages, four and two years before he was born. His father was not seen. His mother denied any knowledge of venereal infection and had never had any symptoms of it. There was no tuberculosis in either family and there had been no known exposure to it.

He was born at full term and was a large, healthy baby. He was weaned when two months old and had considerable disturbance of the digestion during the first two years. His digestion and appetite had been good since that time. He had had occasional "colds" during infancy, but no continuous snuffles. He had never had a rash or complained of sore throat or headache. He had measles when three, and whooping-cough when five years old, soon after which he was treated at the Massachusetts Charitable Eye and Ear Infirmary for interstitial keratitis. He had seen very little with his left eye since then. His teeth began to decay soon after they appeared. He had lost some weight recently, but was active and seemed happy and well. Six months before he was seen a lump, the size of a silver dollar, was noticed on the right shin. This lump had steadily increased in size. A similar swelling appeared on the left leg two months later. Neither had been painful, but the one on the right shin had been somewhat tender for several weeks.

Physical Examination. He was fairly developed and nourished, and somewhat pale. The ear drums were normal. There were corneal opacities in both eyes, more marked on the left. The tongue was clean, the throat normal. There were no mucous patches or rhagades about the mouth. The teeth were much decayed. The heart and lungs were normal. The abdomen was sunken and lax. Nothing abnormal was detected in it. The upper border of the liver flatness was at the sixth rib in the nipple line. The lower border was palpable one and one-half cm. below the costal border in the same line. The spleen was not palpable. The genitals were normal. There was a firm thickening over both tibiæ anteriorly, giving a sabre-like deformity. The swelling on the

right was purplish at the summit, somewhat tender and fluctuated. The extremities were otherwise normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There were no mucous patches about the anus. There were many palpable lymph nodes, the size of peas, in the neck, groins and axillæ. The epitrochlear glands were the size of split peas. There was no eruption and there were no scars of old eruptions. The rectal temperature was 99° F.; the pulse, 100; the respiration, 20.

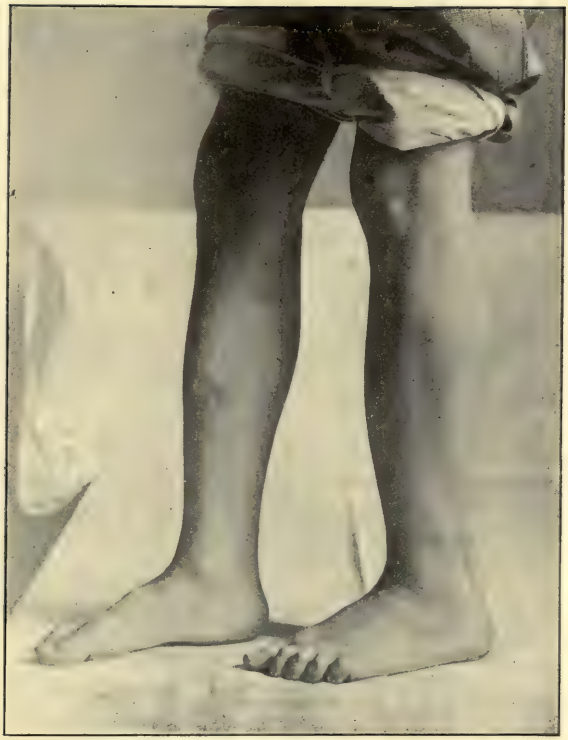
The urine was of normal color, acid in reaction, of a specific gravity of 1024, and contained no albumin or sugar.

The leucocytes numbered 4200.

A skin tuberculin test was negative.

Diagnosis. The lesions which require explanation are the swellings over the tibiæ, one of which is evidently breaking down. The normal temperature, the low white count and the absence of pain show that there is no pyogenic infection of the bones. The negative tuberculin test excludes tuberculosis as the cause. It would be most unusual to have enlargement of both tibiæ if the disease was sarcoma, the growth of the tumor would have been much more rapid and the general condition much more impaired. The only other disease which can cause such swellings is syphilis. The deformity of the legs is, moreover, the typical one of this disease. It is not unusual for gummatous deposits to break down. The general enlargement of the peripheral lymph nodes, especially of the epitrochlears, is corroborative evidence in favor of syphilis, as are the corneal scars resulting from the interstitial keratitis. The fact that the liver is palpable is of some, but not of much, importance, because the liver is sometimes normally palpable at this age. The history of previous miscarriages is confirmatory evidence of syphilis. So also are the decayed teeth, in that they show an early disturbance of the nutrition. A positive diagnosis of SYPHILITIC OSTEOPERIOSTEITIS with breaking down of a gummatous deposit in the right tibia is, therefore, justified.

Prognosis. The prognosis as to life is good. The lesion of the right tibia will heal under antisyphilitic treatment. Some deformity of the tibiæ will undoubtedly remain.



KENNETH B. Case 88.

Treatment. The broken down area on the right tibia must be opened and, if a sequestrum of bone is found, it must be removed. He should be given iodide of potash in as large doses as he can bear. He will probably be able to take one or two drachms daily without injury. It will also be well to start him on a course of inunctions with mercurial ointment (Unguentum Hydragyri). Bichloride of mercury may be substituted for this a little later.

CASE 89. Allen W., sixteen years old, came home from boarding-school for the spring vacation, April 11. He had never had chicken-pox. He had been successfully vaccinated when an infant and again when twelve years old. There had been an epidemic of chicken-pox in the school and he had been repeatedly exposed, the last time having been on March 28. There had also been a number of cases of small-pox in the city near which the school was situated. He had been feeling perfectly well and was sure that there had been no eruption on his skin while he was at school. He noticed a small blister on his chest when he dressed, April 12. That afternoon he began to feel feverish and sick and went to bed. His temperature was then 102° F., and there were several pimples on his chest. He was seen the next morning. He had passed a restless night, because of itching, but was then feeling somewhat better. He had some headache, but no backache.

Physical Examination. He was well developed and nourished and of good color. He was perfectly clear mentally and did not appear seriously ill. His trunk was covered with papules and vesicles. There were a few on the extremities and face and a number on the scalp. The papules did not have a shotty feel, the vesicles were all unilocular and there were no pustules. There was no eruption in the mouth or throat. The tongue was moderately coated. The heart, lungs, liver, spleen, abdomen and extremities were normal. The temperature in the mouth was 100° F.; the pulse, 96; the respiration, 24.

Diagnosis. The diagnosis lies between a rather severe case of chicken-pox and a mild case of small-pox. The known exposure to chicken-pox points much more directly to chicken-pox than does the possible exposure to small-pox. The two successful vaccinations in the past, the last one only four years ago, makes small-pox extremely improbable. The absence of prodromal symptoms and of an initial rash, the appearance of the eruption first on the chest, the greater abundance of the eruption on the trunk than elsewhere, the absence of a shotty feeling in the papules, the unilocular character of the vesicles and the absence of pustules are,

when taken together, sufficient to rule out small-pox. There can be no doubt, therefore, that he has a severe case of CHICKEN-POX.

Prognosis. There is no danger as to life. New crops of papules will probably continue to appear for several days. The temperature will continue slightly elevated for three or four days, but the constitutional symptoms will probably cease sooner than that. There will be no scars, if he does not scratch. Acute nephritis has been known to develop after chicken-pox. This happens so seldom, however, that it hardly needs to be considered, even as a possibility.

Treatment. It will not be necessary to confine his hands, because he is old enough to appreciate the harm which he may do by scratching. He should be well smeared, however, with some simple ointment, such as unguentum zinci oxidi or unguentum aquæ rosæ, in order to allay the itching. If this does not quiet it, a solution of bicarbonate of soda, a mixture of equal parts of alcohol and water, or a one per cent solution of carbolic acid may be tried. If none of these is effectual, a saturated solution of camphor in ether may be painted on and allowed to dry. He should be kept in bed until his temperature is normal and the constitutional symptoms have ceased. He should be given a rather light diet and made to drink considerable water. An occasional dose of five or ten grains of a mixture of equal parts of phenacetine and salol will probably make him more comfortable. No further treatment, unless it be a laxative, is required.

He should be kept in quarantine until all the scabs have come off. It will not be necessary to disinfect his room.

CASE 90. James T., ten years old, had had none of the eruptive diseases. There was an epidemic of measles in Boston at the time, and one of the boys at his school had come down with it February 13. He began to be feverish during the afternoon of February 25, and, as he expressed it, "felt bum." His mouth temperature that night was 103° F. It dropped to 100° F. the next morning and remained under 101.5° F. until the afternoon of March 1, when it rose to 102.1° F. He continued to feel miserable, but was up and about the room until the afternoon of March 1. A loose cough, which developed the first night, had persisted. His conjunctivæ became a little inflamed February 28. His appetite was poor, but there had been no disturbance of the digestion or other symptoms. He was seen late in the afternoon of March 1.

Physical Examination. He was fairly developed and nourished and of fair color. He was perfectly clear mentally. The conjunctivæ were somewhat injected and there was slight photophobia. The ear-drums were normal. There was a moderate nasal discharge. The whole throat was slightly reddened and there was an excessive amount of naso-pharyngeal secretion. The tongue was moist and moderately coated. There were numerous pearly-white spots, the size of the shaft of a pin, surrounded by reddened areas, the size of the head of a pin or a little larger, on the inside of both cheeks. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes and no eruption. The temperature, taken in the mouth, was 102.1° F.; the pulse, 120; the respiration, 35.

The leucocytes numbered 18,000.

Diagnosis. The sudden onset of an acute disease, associated with catarrhal symptoms, in a child known to have been exposed to measles twelve days before (this being the usual incubation period of measles), is very strong presumptive evidence in favor of measles. The persistence and increase of the catarrhal symptoms, although the temperature is lower

than in the beginning, is characteristic of the prodromal stage of measles and strengthens the evidence in favor of this disease. The slight leucocytosis and the absence of symptoms pointing to any other condition are consistent with this diagnosis. The spots in the mouth are unquestionably Koplik's spots. These spots are pathognomonic of MEASLES and make the diagnosis certain. This being the fifth day of the disease and the temperature having begun to go up again, it can be confidently expected that the eruption will appear during the night or to-morrow.

Prognosis. He is in good general condition, his temperature is not very high, he is not seriously intoxicated and his lungs are clear. He can be expected, therefore, with proper care, to recover quickly without complications or sequelæ. Children of his age are less likely than infants and young children to develop severe bronchitis or bronchopneumonia.

Treatment. He should be kept in bed until his temperature is normal, the eruption faded and the signs of bronchitis, if he has it, gone. It is not only not necessary but actually harmful to shut children with measles up in a hot, close, dark room, as was formerly done. The temperature of the room should be kept at about 60° F. and the windows should be kept open enough to give an abundance of fresh air. The room need not be darkened, unless the light hurts his eyes. His diet should be made up chiefly of milk and starchy foods. Water should be given freely. He should be given cleansing baths regularly, there being no more danger in bathing patients with measles than those with other diseases. His eyes should be washed frequently with a 4% solution of boracic acid. He may be given five grain doses of a mixture of equal parts of phenacetine and salol, every three or four hours, if he is uncomfortable. If he develops bronchitis, it should be treated like any other bronchitis (see Cases 104 and 105). He should be kept in isolation until the desquamation and all catarrhal symptoms have ceased. It will not be necessary to disinfect the room after his recovery, a thorough airing being amply sufficient to prevent contagion.

CASE 91. Nathaniel T., seven years old, lived in the country in an isolated house. He did not go to school and had not been away from home for several weeks. He was seen in consultation, March 26.

A boy, eleven years old, came to visit him, March 9, from a school in which there was an epidemic of German measles. This boy had not had any of the eruptive diseases. Having felt perfectly well previously, he vomited March 11, and soon after an eruption appeared on the neck and chest. The fauces were red and the temperature in the mouth 101° F. The eruption gradually extended all over the body and extremities and lasted three days. The efflorescence was uniform, but the tongue was not characteristic of scarlet fever. There was no enlargement of the cervical lymph nodes. The diagnosis of scarlet fever was made and he was isolated. He did not desquamate at all, however, and felt perfectly well and had no temperature after the second day.

The tutor, a young man who had had both scarlet fever and measles, went to bed feeling perfectly well, March 25. He was feverish during the night and on going to bathe in the morning noticed a profuse rash on his chest. He was seen at noon. His temperature, taken in the mouth, was 99° F. There was no Koplik's sign. There was a rash over the chest, back and arms, resembling closely that of measles, but none on the face or legs. His eyelids were not puffy and there was no nasal discharge.

A chambermaid, who had been taking care of the room of the first patient, felt feverish the morning of March 26, and noticed a rash. She had had no prodromal symptoms. She also was seen at noon. Her temperature, taken in the mouth, was 100° F. Her conjunctivæ were a little injected and her eyelids a little puffy. She was, however, very much alarmed and had been crying for several hours. There was no rash in the throat and no Koplik's sign in the mouth. The papillæ of the tongue were not enlarged. There was a rash on the face, chest and arms which resembled measles, but was rather brighter in color and was here and there confluent. There was no enlargement of the cervical lymph nodes.

Nathaniel T. had been perfectly well until March 24, when

he was a little feverish. The temperature was normal the morning of March 25, but there was a fine rash here and there on the body. This disappeared during the day, but his temperature went up to 101° F. that night. The rash appeared again the morning of March 26 and the temperature, taken in the mouth, was 100° F. He was seen at noon.

Physical Examination. He was well developed and nourished and of good color. He seemed to feel perfectly well. There was no eruption in the throat and no Koplik's sign in the mouth. The tongue was slightly coated, but the papillæ were not enlarged. He had no cough or nasal discharge and the conjunctivæ were not inflamed. There was no enlargement of the cervical lymph nodes. The heart, lungs, liver, spleen, abdomen and extremities were normal, as were the deep reflexes. There were a few light-pinkish papules, about the size of the head of a pin or a little larger, scattered over the body and arms. There was no eruption on the face or legs. His mouth temperature was 99.6° F.

Diagnosis. It is evident that the last three patients have the same disease. It is also evident, from the fact that the onset in all occurred within a period of forty-eight hours, that they must have contracted it from the same source. It seems reasonable to suppose that the visitor was this source and that he also has the same disease. The period of incubation in the last three patients was approximately fourteen days. This, of itself, is sufficient to make scarlet fever very improbable, the period of incubation in this disease being almost never over eight days. The tutor has already had scarlet fever, and second attacks of this disease are very uncommon. The onset in all of them was comparatively mild, none of them have a sore throat, redness of the fauces, enlargement of the papillæ of the tongue or of the cervical lymph nodes, while the eruption does not resemble that of scarlet fever. Scarlet fever can, therefore, be positively excluded. The diagnosis lies, then, between measles and German measles. The period of incubation is consistent with either disease. Nathaniel is the only one of the three that had any prodromal symptoms, and they were very slight. The chambermaid is the only one that has any catarrhal

symptoms, and they are probably the result of crying. None of them have any eruption in the throat, and Koplik's sign is absent in all. Measles can, therefore, also be excluded. The only point against German measles is the absence of enlargement of the cervical lymph nodes. This is of very little importance in the diagnosis from measles, however, as it is often absent in German measles and often present in measles. It is very evident, therefore, that Nathaniel has GERMAN MEASLES. It is also plain that the visitor had the scarlatiniform type of the disease, with an unusually acute onset, and that he brought the disease with him from school.

Prognosis. There is, of course, no danger to life. He will probably not feel any sicker than he does to-day. The rash will almost certainly be gone within three days and there will be no desquamation.

Treatment. It will be wise to keep him in bed and on a rather light diet until his temperature has reached normal and the rash has faded. No other treatment is necessary. He should be kept away from other children for three weeks, unless their parents are willing that they should have the disease.

CASE 92. Mary M., seven years old, had always been well, except for frequent attacks of acute gastric indigestion as the result of indiscretions in diet. She had never had any eruption in these attacks. She had been a little out of sorts and had complained of a sore throat for two days, but had been to school in spite of it. She had not vomited and had eaten nothing unusual. She was seen early in the morning of the third day.

Physical Examination. She was well developed and nourished, and did not look or act especially sick. Her cheeks were somewhat flushed. Her tongue was covered with a slight, white coat, except at the tip and edges, which were clean. The papillæ were somewhat enlarged and showed distinctly through the coating. The tonsils were moderately enlarged, but there was no exudation on them. The whole throat was bright red and it could be seen that on the soft palate this redness was due to a large number of very fine, bright red spots. The heart, lungs, abdomen and extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was a bright red rash over the front of the neck and the whole trunk. It extended on to the upper arms and downward over the anterior surface of the thighs. It was most marked in the folds of the axillæ and groins. It was found on close inspection to be made up of minute red spots, corresponding to the papillæ of the skin, with normal skin between them. It did not itch. The temperature, taken in the mouth, was 102° F.; the pulse, 112; the respiration, 24.

Diagnosis. The only diseases which need to be considered in this instance are erythema from indigestion or food poisoning, German measles and scarlet fever. Erythema can be ruled out on the absence of all signs of indigestion and of any indiscretion in diet, the eruption in the throat and the enlargement of the papillæ of the tongue. The peculiar distribution of the rash and the greater intensity of the eruption in the folds of the axillæ and groins are also against it. German measles can be excluded on the eruption in the throat and the enlargement of the papillæ of the tongue, although

the mildness of the onset and the constitutional symptoms suggest it. The diagnosis of SCARLET FEVER by exclusion is, therefore, justified. The eruption in the throat, the enlargement of the papillæ of the tongue, the distribution of the rash, its peculiar characteristics and the greater intensity of the eruption in the folds of the skin make up a symptom-complex, moreover, which is characteristic of scarlet fever and which is presented by no other disease.

Prognosis. She has a very mild type of the disease. The tonsils are but little enlarged, there is no exudation in the throat and the cervical lymph nodes are not enlarged, although this is the third day of the disease. The chances of any severe infection of the throat and cervical lymph nodes are, therefore, small. Acute nephritis very seldom develops, if patients are properly fed and protected. She will be. Inflammation of the heart and joints sometimes occurs. There is no way of avoiding these complications. Fortunately, however, they are comparatively infrequent. She can be expected, therefore, to recover quickly without complications.

Treatment. She must be put to bed and kept there until desquamation has ceased. The temperature of the room should be kept between 60° F. and 64° F. Her diet should be so regulated as to provide a sufficient number of calories and at the same time throw as little work as possible on the kidneys, that is, on exactly the same lines as in acute nephritis (see Case 137) in order to prevent its development. She should drink a large amount of water in order to dilute as much as possible the products of metabolism which are eliminated by the kidneys. She should take at least a quart of water daily in addition to the liquid which she gets in her food. Her throat should be sprayed frequently with some mild alkaline wash, like the liquor antisepticus alkalinus. She should be given a cleansing bath daily, after which she should be anointed freely with vaseline or lanoline. She will require no other treatment, unless it be for the relief of symptoms like constipation or sleeplessness.

She must be isolated with her attendant until desquamation and all catarrhal symptoms and discharges, if any de-

velop, have ceased. If desquamation does not appear at the usual time, she must be isolated for three weeks. If it does not appear before this, it is safe to assume that it will not later. Nothing that has not been previously disinfected should go out of her room. All scraps of food and other small articles, such as pieces of gauze or muslin used in place of handkerchiefs, that can be disposed of in the room should be destroyed there. When she has ceased desquamating she should be given a disinfecting bath in her room, step out of the door into a clean blanket and dress elsewhere in her clean clothes.

CASE 93. Gertrude W., twelve years old, was the only child of healthy parents. There was, however, a marked tendency to nephritis and an excess of uric acid in the urine in both families. She had always been well, except for measles, complicated by nephritis, when she was six years old. She had the family tendency to an excess of uric acid in the urine, however, and had to take large amounts of water in order to keep well.

She had a chill and vomited early in the morning of November 23. The vomiting continued all day. The temperature rose quickly to 104° F. and had ranged between 104° F. and 105° F. since that time. The throat became sore during the day. An urticarial eruption appeared during the morning of November 24 and had come and gone since then. The typical rash of scarlet fever developed in addition during the morning of November 25. The vomiting began again and had persisted. The bowels were thoroughly moved by calomel during the day. She passed urine freely up to 10 A.M., November 25. Nine ounces were obtained by a catheter at 3 A.M., November 26. This urine was black, of a specific gravity of 1025, and contained a large trace of albumin. The sediment, which was very heavy, contained a little normal blood, very many dark-brown, cast-like bodies and much granular detritus. Her pulse ran about 120 and was of good character up to the afternoon of November 25. Since then it had varied between 130 and 150 and had been feeble. She was seen in consultation at 9 A.M., November 26.

Physical Examination. She was an unusually large, well developed girl. She was very drowsy, but was conscious when roused. The tongue was very red and dry; the papillæ were much enlarged. The whole throat was a brilliant red. The tonsils were considerably enlarged, but there was no exudation on them. The cervical lymph nodes were not enlarged. The cardiac impulse was somewhat feeble and diffuse. The upper border of the cardiac dullness was at the upper border of the third rib, the right border three and one-half cm. to the right, and the left eight and one-half cm. to the left of the median line. The action was slightly irregular and the first sound a little weak. There were no murmurs. The

lungs and abdomen were normal. The liver and spleen were not palpable. There was no dullness over the pubes and the bladder could not be felt. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was a typical scarlet fever rash on the face, neck and chest, with a characteristic white line about the mouth. There were also many large and small blotchy, erythematous areas, in many places somewhat elevated above the surface, scattered over the trunk and extremities. The hands and feet were slightly cyanotic. The axillary temperature was 105° F.; the pulse, 140; the respiration, 35.

Diagnosis. She undoubtedly has a very malignant type of SCARLET FEVER. Myocarditis and acute nephritis have already developed.

Prognosis. The infection is such a virulent one, as is shown by the early development of myocarditis and nephritis, that her chances of recovery are very slight. The family tendency to nephritis and uric aciduria, already manifested in her in the past, makes the outlook still more unfavorable. She will probably not live more than forty-eight hours.

Treatment. She should, of course, be isolated and the usual precautions necessary in the treatment of scarlet fever taken (see Case 92). It is very hard to know just how to treat her. It will be unwise to attempt to reduce the temperature by the use of cold externally, because of the danger of increasing the congestion of the kidneys. An ice cap will, however, probably do no harm in this way and may perhaps reduce the temperature a little. She should have an abundance of fresh, cool air to breathe to stimulate the vaso-motor system, but must at the same time be well protected. Warm baths should be tried with the hope of relieving the kidneys by inducing sweating. The danger of increasing the temperature in this way must, however, be borne in mind. Hot air baths are contraindicated on this account. Her bowels must be freely opened, also with the object of relieving the kidneys. Epsom salts, in doses of one-half an ounce, will do this most satisfactorily, if they are not vomited. If they are, compound jalap powder in doses of thirty grains, or

trituration of elaterin in doses of one-half of a grain, may be tried. Water is, on general principles, contraindicated by the acute congestion of the kidneys (see Case 137). She has a tendency to uric aciduria when well, however, and in health requires large quantities of water. It will be well, therefore, to allow her a pint of water in the twenty-four hours. Food should be stopped entirely for the next twenty-four or forty-eight hours. Little can be expected from cardiac tonics or stimulants, because the weakness of the heart is due to myocarditis. The cardiac tonics are, moreover, contraindicated by the acute congestion of the kidneys. It will be wise, however, to give her one-sixtieth of a grain of strychnia every three hours, and caffeine-sodium benzoate, in doses of one grain, from time to time, if necessary.

CASE 94. Charles T., eleven years old, had never had the mumps, but had been exposed to them at school three weeks before. He went to bed feeling perfectly well, but was waked up several times in the night by pain in his face. He found in the morning that his face was swollen and somewhat painful and that it hurt him to open his mouth and chew. He did not feel sick in other ways. He was seen at ten in the morning.

Physical Examination. He was a large, strong boy in very good condition. His cheeks were a little flushed. There was a diffuse swelling on the left side of the face extending upward in front of the ear, forward to the beginning of the zygomatic arch, downward to a little below the angle of the jaw, backward to the sternocleidomastoid muscle and upward behind the ear. This swelling was moderately tender, but was not red and did not fluctuate. There was a similar swelling over the ramus of the lower jaw on the right. The mouth was somewhat dry and the tongue slightly coated. There was reddening and swelling about the mouths of Stenson's ducts. The throat was normal. The heart, lungs, abdomen, external genitals and extremities were normal. The liver and spleen were not palpable. The temperature in the mouth was 99.4° F.

Diagnosis. The only diseases which need to be considered are cervical adenitis and mumps. The presumption is that he has mumps, because the swelling appeared exactly three weeks after the known exposure to mumps, that is, at the end of the usual period of incubation. The sudden appearance of the swelling without any previous inflammation of the throat or mouth is characteristic of mumps. Cervical adenitis develops more slowly and is always preceded by some inflammatory condition in the mouth or throat. The position of the tumor is that of the parotid gland. The swelling in cervical adenitis does not extend on to the face or around the ear, but is all behind the jaw. The dryness of the mouth and the reddening and swelling about the openings of Stenson's ducts are also characteristic of mumps and do not occur in cervical adenitis. The disease is, therefore, certainly MUMPS.

Prognosis. There is no danger as to life. The swelling on the right side will increase for a time, but that on both sides will probably be gone in a week. The constitutional symptoms will not last more than three or four days. The submaxillary glands may also be involved, but the chances are that they will not. It is possible that orchitis may develop in the course of ten days or two weeks, but very improbable, as this complication is very unusual in children under twelve years of age. Acute nephritis, endocarditis, permanent deafness and suppuration of the parotid gland have been known to develop as sequelæ of mumps, but they occur so seldom that they hardly need to be taken into consideration.

Treatment. He should stay in bed until the swellings have subsided, and, on account of the danger of the development of orchitis, should be very careful about exposure for at least three weeks. Heat applied externally by means of a poultice, an electric heating pad or a hot-water bag, will probably make him more comfortable. His mouth should be rinsed several times daily with some simple alkaline wash, like the liquor antisepticus alkalinus. He may have five grains of a mixture of equal parts of phenacetine and salol, every three hours, if his head aches or he is generally uncomfortable. He may have anything within reason to eat that he is able to take without discomfort. He should keep away during the next four weeks from people who have not had the mumps. It will not be necessary to disinfect his room.

CASE 95. Elmer B., seven years old, had always been well, except for occasional "colds" and an attack of chicken-pox when he was five years old. There was an epidemic of whooping-cough in the town where he lived and there had been a number of cases in the school which he attended. He began to have a "cold in his head" ten days before he was seen. The nasal discharge had diminished, but a cough, which developed after two or three days, had persisted. Spraying the nose and throat had had no effect on it. It had been frequent, short and dry at first, but during the last few days he had coughed much less often. The cough had become more paroxysmal in character, however, and was harder. He had "strangled" quite badly in one attack the morning of the day he was seen, and had vomited from coughing once the day before. His general health had not been affected in any way and his appetite and digestion were good. He had not whooped. He had been taken out of school when the coryza began, but had been allowed to play and sleep in the same room with his younger sister. The object of the mother in calling a physician was to find out whether or not he had whooping-cough, in order that he might go back to school if he had not, and that she might take proper measures to protect the younger child, if he had.

Physical Examination. He was well developed and nourished, and of good color. He acted perfectly well. There was a slight nasal discharge and the pharynx and fauces were slightly reddened. The mouth and throat were otherwise normal. The heart, lungs, abdomen and extremities were normal. The intensity of the respiratory sound was the same on both sides. The bronchial voice sound was not heard below the seventh cervical spine. The liver and spleen were not palpable. The deep reflexes were normal and the peripheral lymph nodes were not enlarged. He coughed once during the examination. The cough was somewhat paroxysmal in character, but there was no whoop. His temperature, taken in the mouth, was 98.4° F.

Diagnosis. The presence of an epidemic of whooping-cough in the town and the fact that there have been a number of cases in his school are strong presumptive evidence in favor

of whooping-cough. The persistence of the cough, in spite of the subsidence of the coryza, the slightness of the signs of local inflammation in the throat and the absence of all evidences of bronchitis also points strongly to whooping-cough. So does the good general condition and the absence of all other symptoms. More important than anything else, however, is the change in character of the cough from frequent, short and dry to paroxysmal at longer intervals. The vomiting with the cough is corroborative evidence. The absence of a whoop at the end of ten days does not count much against whooping-cough, because the whoop in many instances does not appear for several weeks and sometimes even not at all. The slightness of the signs of local irritation in the nose and throat and the paroxysmal character of the cough seem sufficient to exclude local irritation as the cause. A paroxysmal cough, in some instances associated with a sound much like a whoop, sometimes develops after influenza. The onset, together with the absence of fever and constitutional symptoms, is, however, sufficient to rule out this condition as the cause. Enlargement of the tracheo-bronchial lymph nodes also sometimes causes a paroxysmal cough. The absence of the bronchial voice sound below the seventh cervical spine and of all evidences of compression from enlarged glands excludes this condition. The diagnosis of WHOOPING–COUGH seems justified, therefore, although he has not whooped. It will be well also to examine the blood. The finding of a leucocytosis with a relative lymphocytosis will be strong confirmatory evidence that he has whooping-cough.

Prognosis. Judging from the mildness of the symptoms and the absence of complications at the end of ten days, he will have a mild and short attack. He is, moreover, in good general condition and well able to bear the loss of rest and food, if it turns out to be a severe one. His circumstances are such that he will receive the best of care and be guarded against exposure. In all probability, therefore, he will have no complications and will pass through the disease without being much pulled down by it.

Treatment. It is very important for him to have an abundance of fresh air. There is no reason why he should

not be out of doors on pleasant days, even if it is January. If the weather is bad, he should play in the house in a room with the windows open. If this is not feasible, he should change from room to room, each room, as he vacates it, being thoroughly aired before he returns to it. The windows should also be well open at night. It will not be necessary to change his diet, if he does not vomit. If he vomits, he must be given another meal to make up for the one he has lost. If the vomiting is very frequent, it will be well to feed him every three or four hours with comparatively small amounts of those foods which leave the stomach quickly, such as milk, raw eggs and starches. It will also be well, if the vomiting is severe, to try the abdominal belt recommended by Kilmer.

Local applications to the nose and throat are useless. So also are applications to the chest. Inhalations of steam, plain or medicated with creosote or similar drugs, may help him some, but must not be used to the exclusion of fresh air. There are no drugs which limit the course of whooping-cough, although there is a considerable number which diminish the frequency and severity of the paroxysms to a certain extent. To do good, however, they must be pushed up to their physiological limit. It seems hardly advisable to use them in this instance, therefore, unless the symptoms become much more severe than appears probable. If it becomes necessary to use any of them, antipyrin, bromoform or the bromides are the ones most likely to help him. If his sleep is much disturbed, there will be no objection to giving him bromide, sulphonal or trional at night.

The bacillus described by Bordet and Gengou is, without much doubt, the cause of whooping-cough. The treatment of this disease with vaccines, prepared from this organism, has thus far been so unsatisfactory, however, that it is hardly worthy of a trial.

It will be useless to attempt to separate him from his sister now, because, as whooping-cough is contagious from the appearance of the catarrhal symptoms, she certainly has already contracted the disease. He should, however, be kept away from other children who have not had it, until he has ceased to whoop and to have definite paroxysms.

SECTION VI.

DISEASES OF THE NOSE, THROAT, EARS AND LARYNX.

CASE 96. Virginia G., seven months old, had always had a rather feeble digestion, but had recently been doing very well on a wet nurse. She had had a " cold in the head " about six weeks before. Soon after recovery from this cold, which lasted about a week, she began to have paroxysms of cough at night and during her naps. The cough disturbed her sleep considerably, but not enough to affect her general condition. She did not cough much when awake, had no nasal discharge or fever, did not snore at night or keep her mouth open, and nursed well.

Physical Examination. She was small but fairly nourished and of fair color. The anterior fontanelle was 3 cm. in diameter and level. There was no snuffles and she kept her mouth shut. There were no teeth and the gums were not inflamed. The fauces were normal. The membranæ tympanorum were normal. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. The cervical lymph nodes were slightly enlarged.

Diagnosis. The physical examination shows nothing in the nose, fauces or chest to account for the cough. There are no evidences of otitis media, difficult dentition or disturbance of digestion, all of which are sometimes said to be causes of reflex cough. A " nervous " cough probably does not occur at this age. Nevertheless, she coughs, and there must be some cause for it. This cause will probably be found in the nasopharynx, the only region not investigated in the physical examination, in spite of the absence of all of the symptoms of adenoids common in older children. An examination of the

nasopharynx then showed a small amount of soft ADENOIDS, not sufficient to interfere in any way with respiration. Adenoids of this sort, however, if inflamed, will often secrete just enough fluid to keep up a constant tickling of the throat and cough when the baby is asleep. They are one of the most common causes of persistent cough in infancy.

Prognosis. Removal of the adenoids will stop the cough at once.

Treatment. It is hardly worth while to waste time on palliative measures, such as applications to the nasopharynx through the nose or mouth, when operation will remove the cause at once and hence cure the cough. The operation is a simple one and not at all dangerous. There is, moreover, a certain amount of risk in leaving the adenoids *in situ*, because they are often the starting point of attacks of rhinitis and otitis media and, if they increase in size, will cause obstruction to nasal respiration. It is true that they may grow again but, if they do, they can be removed again. In the meantime, the baby is relieved of its symptoms and freed from the dangers to which adenoids expose it.

CASE 97. John W., twenty-five months old, had always had a rather feeble digestion and been backward in development. He had taken less and less solid food during the last three months, and for the last month had refused everything but liquids. Swallowing seemed to trouble him. He did not vomit, had no flatulence or hiccough, and had one small, normal movement daily. He had lost considerable weight, strength and color during the past month. He had no cough or nasal discharge, kept his mouth shut and did not snore at night. There had been no fever.

Physical Examination. He was fair-sized, but flabby and pale. The anterior fontanelle was not quite closed. There was no nasal discharge. The membranæ tympanorum were normal. He kept his mouth shut. He had twenty teeth. His tongue was clean. The tonsils were somewhat enlarged, but not inflamed. There was a slight rosary. The heart and lungs were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen was rather large and lax, but otherwise normal. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal, but rather feeble; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes.

Diagnosis. The rosary shows that he has, or has had, a certain amount of rickets. The open fontanelle and large abdomen are probably also manifestations of the same disease. The flabbiness and pallor are presumably due to an insufficient supply of food. The unwillingness to eat can hardly be due to loss of appetite from indigestion because there are no other symptoms of indigestion. The enlargement of the tonsils seems hardly great enough to interfere mechanically with the swallowing of solid food. There must be, therefore, some other cause. This will probably be found in the nasopharynx, as ADENOIDS in some way often make swallowing difficult. Examination of the nasopharynx with the finger showed a large mass of firm adenoids situated posteriorly, so that they did not interfere with respiration. In the absence of any other explanation it is almost certain that the adenoids, or the adenoids and the enlarged tonsils

together, make the swallowing of solid food so uncomfortable that he is unwilling to take it. In consequence, he is taking an insufficient amount of nourishment and this, in turn, is the cause of the progressive failure.

Prognosis. The removal of the tonsils and adenoids will soon be followed by willingness to take solid food. When he begins to take a proper amount of nourishment he will soon regain his weight, strength and color.

Treatment. The treatment is the immediate removal of the tonsils and adenoids.

CASE 98. Mary S., four years old, had had a slight nasal discharge and seemed a little feverish all day. She went to bed feeling fairly well, however, after eating her usual supper. Soon after going to sleep she began to cough from time to time, the cough being dry, hard and metallic. About nine o'clock her parents heard her breathing noisily and apparently struggling in her sleep. When they got to her they found her sitting up in bed moderately cyanosed and breathing with much difficulty. Inspiration was noisy and difficult, expiration quiet. She occasionally gave a short, dry, metallic cough. She tried to cry out, but could not raise her voice above a whisper. At times she clutched at her throat. She was seen at 9.30 P.M.

Physical Examination. She was then breathing quietly and her color was good. Her voice was hoarse and her cough metallic. There was a slight nasal discharge and the throat was a little reddened. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and lively. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 101° F.

Diagnosis. The only diseases to be considered are laryngeal diphtheria and catarrhal laryngitis with "spasmodic croup." The sudden onset and the short duration of the difficulty in respiration positively rule out laryngeal diphtheria, in which the onset is slow and the difficulty in respiration steadily increases without intermissions. The history of the nasal discharge during the day and the occurrence of the attack in the early evening are also very characteristic of "spasmodic croup." The diagnosis is, therefore, CATARRHAL LARYNGITIS with "spasmodic croup."

Prognosis. There is, of course, no danger as to life. She may or may not have another attack during the night. She is likely to have paroxysms the next two or three nights unless they are prevented by treatment. Having had "spasmodic croup" once, she is likely to have it for the next few years whenever she "catches cold."

Treatment. This attack is a mild one and does not require

very active treatment. She should have twenty drops of the wine of ipecac and ten drops of paregoric at once, and ten drops of the wine of ipecac and five drops of paregoric every hour for two or three doses, the object being to relax, but not to nauseate her. A " croup kettle " or a dish of boiling water in the room will moisten the air and will aid in preventing the recurrence of the paroxysms. The temperature of the room should be kept at about 64° F. She should be kept in the house or, if feverish, in bed for the next three or four days, and should be given ten drops of the wine of ipecac every hour, beginning at 3 P.M., until bedtime, each afternoon. If the paroxysms recur, the treatment recommended for to-night should be repeated.

CASE 99. George T., thirteen months old, began to refuse his food February 24. He was feverish and lost weight rapidly. He took his food very poorly, but did not vomit and his dejections were normal. He had a frequent, painful cough. There was no nasal discharge. He was sent to the Infants' Hospital February 28 with the diagnosis of bronchitis.

Physical Examination. He was fairly developed and nourished. He was pale, but not cyanotic. The general appearance was that of sepsis. The anterior fontanelle was 3 cm. in diameter and level. There was slight puffiness about the eyes. There was a considerable general, soft, non-fluctuant swelling in the right neck, extending forward from about the angle of the jaw to just beyond the median line and downward over the clavicle. The alæ nasi moved with respiration. There was no nasal discharge. He held his head slightly extended and kept his mouth open. His throat was full of thick mucopurulent material which rendered inspection difficult. The right tonsil was moderately enlarged and somewhat reddened. The respiration was somewhat difficult, but not noisy. His cry was clear. There was no retraction of the suprasternal, supraclavicular or intercostal spaces. Percussion of the lungs showed nothing abnormal. Respiration was normal in character but diminished in intensity. Numerous medium and coarse moist râles were heard throughout both chests, both back and front. They were exactly alike on both sides. The same sounds were heard under the upper part of the sternum and in the middle of the back. The abdomen showed nothing abnormal. The liver was just palpable in the nipple line. The spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. The rectal temperature was 104.5° F., the pulse 150, the respiration 35.

The urine was high in color, acid in reaction, of a specific gravity of 1,020, and contained no albumin or sugar.

The leucocyte count was 30,000.

Diagnosis. The quiet respiration and the clear cry show that there is no trouble in the larynx. The facts that the râles are alike on both sides, both back and front, and that

the same sounds are heard under the manubrium and in the middle of the back show that they are made high up and transmitted downward through the bronchi, and not made in the chest. This, of course, rules out bronchitis. The high temperature, the marked leucocytosis and the general appearance of sepsis point very strongly to a focus of pus somewhere. The soft, non-fluctuant character of the swelling in the neck is not consistent with an external abscess. The swelling of the tonsils is not as much as would be expected if there was a peritonsillar abscess. The unwillingness to take food, the puffiness of the eyes, the swelling of the neck, the position of the head and the prominence of the tonsil all suggest an inflammatory process in the nasopharynx. The collection of pus is, therefore, probably in the nasopharynx; that is, there is almost certainly a RETROPHARYNGEAL ABSCESS. It is noted in the physical examination that, on account of the large amount of mucopurulent material in the throat, inspection was difficult, and, therefore, presumably unsatisfactory. In such cases inspection alone is not sufficient and will often fail to reveal serious conditions. The throat should always be palpated when inspection is not perfectly satisfactory. Palpation, in this instance, showed that the right side of the pharynx was filled by a tense, elastic swelling which extended downward to the level of the larynx and pushed the tonsil forward, thus confirming the diagnosis of retropharyngeal abscess.

Prognosis. The prognosis is grave even if the abscess is opened at once, as it should be, because the baby is in poor condition and generally septic and may not be able to rally even when the source of infection is removed.

Treatment. The treatment is to open the abscess at once. It is not safe to leave it alone, because if it does not rupture of itself it interferes with deglutition and respiration and there is constant absorption from the abscess, and if it does open itself there is danger of suffocation from the sudden discharge of pus or of a secondary inhalation bronchopneumonia. It is far better to open it through the mouth than from the outside. The best way to open it is with a knife, guarded except at the point, passed along the finger as a

guide. A gag must not be used, because, if the mouth is opened too widely, sudden death may result from the pressure of the abscess on the pneumogastric nerve. The mouth can be held sufficiently wide open with the finger or a tongue depressor. The incision is best performed with the patient in the upright position. If he is tipped forward the instant the incision is made, there is no danger of pus entering the air passages. The incision must be opened up widely with the finger in order to insure the thorough emptying of the abscess cavity. The abscess should be squeezed once or twice daily with the finger to keep up the drainage and to prevent the opening from closing. It will be well to wash out the mouth several times daily with some mild alkaline solution.

If he does not take his food well he must be fed with a tube, introduced through the mouth. No stimulation is necessary at present.

CASE 100. Jennie C. was the first child of healthy parents. She was born after a normal labor, was nursed for six months and did well. When six months old she was said to have had pneumonia and some brain trouble with it; at any rate, she had convulsions. During and since this illness she had been fed on Horlick's Malted Milk, prepared with water. She had lost weight, had vomited occasionally and had had a dozen or more small, green, watery movements daily. Her nose was always stopped up. She kept her mouth open and had considerable cough. For two weeks she had had many attacks daily in which she made a crowing sound, held her breath and got black in the face. During the last week several of these attacks had terminated in convulsions. She was seen when seven months old.

Physical Examination. She was fairly developed and nourished. The anterior fontanelle was 5 cm. in diameter, but level. There was no craniotabes. The head was of good shape. The eyes were rather prominent. She was bright and intelligent. The pupils were equal and reacted to light. The nares were partially occluded and the mouth was kept open. The throat showed nothing abnormal on either inspection or palpation. An attempt to introduce the finger into the nasopharynx was unsuccessful. The tongue was dry and considerably coated. There were no teeth. There was a marked rosary. She held up her head, but was unable to sit alone. The heart and lungs were normal. The abdomen was rather large and lax. The lower border of the liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. There was slight enlargement of the epiphyses at the wrists. There was no spasm or paralysis of the extremities. The knee-jerks were equal and lively. There was no Kernig's sign. During the examination she started to cry, then drew in her breath with a crowing noise, stopped breathing and became moderately cyanosed. After perhaps a minute she began to breathe again and her color quickly became good. The mother said that this attack was a very mild one and not nearly as severe as many.

Diagnosis. The condition here is a complicated one. She undoubtedly has a chronic intestinal indigestion as the result

of improper feeding. She also has a moderate amount of rickets. This is proved by the marked rosary and the enlargement of the epiphyses at the wrists. Other abnormalities which are presumably signs of rickets are the large fontanelle, the delayed dentition and the lax abdomen. She has, in addition, a chronic rhinitis and presumably adenoids, although this is not proven, since the attempt to examine the nasopharynx was unsuccessful.

The most important conditions, however, at any rate in the opinion of the parents, are the attacks of asphyxia and the convulsions. These attacks are so characteristic of the condition known as LARYNGISMUS STRIDULUS that a differential diagnosis is hardly necessary. The diseases which might possibly be confused with it are congenital laryngeal stridor, catarrhal laryngitis and laryngeal diphtheria. Congenital stridor is present at birth, or develops soon after, is constant instead of being paroxysmal and is not accompanied by cyanosis. The attacks of difficult respiration in catarrhal laryngitis occur less frequently and usually only at night, are of longer duration and the breath is never held in them. The difficulty with respiration in laryngeal diphtheria is constant and progressive and the breath is not held.

Laryngismus stridulus is not properly a disease, but merely a manifestation of the spasmophilic diathesis. In this disease there is a marked increase in the nervous excitability, which shows itself in various ways, the most characteristic manifestations being laryngismus stridulus, tetany and convulsions. The convulsions in this instance are undoubtedly merely another manifestation of this diathesis. It is almost certainly due to some disturbance in the metabolism of calcium. It is uncertain whether this disturbance is or is not due to parathyroid insufficiency. There is in all probability a deficiency of calcium salts in the blood in the spasmophilic diathesis. It is very possible that her food during the past month contained an insufficient amount of calcium, or contained it in a form not easily utilized. The rickets is to be regarded, therefore, merely as another manifestation of the disturbance of nutrition from the unsuitable food and not as the cause of the paroxysmal attacks. The rhinitis and

adenoids can have no direct etiological connection with the attacks, but may possibly act as exciting causes through reflex irritation.

Prognosis. The immediate prognosis of the attacks is, on the whole, good, but must be guarded, because babies do sometimes die in these attacks. The prognosis in general depends very largely on whether or not she can get the best treatment. If she can, recovery will be rapid; if she cannot, the chances are rather against her.

Treatment. The immediate treatment of an attack is to slap her on the back or to dash cold water on her face or chest. Artificial respiration is sometimes necessary. Most attacks will, however, cease quickly if nothing is done. Bromide of soda, in doses of from three to five grains, in an aqueous solution, three or four times daily, will tend to diminish the frequency of the paroxysms.

The treatment of the spasmophilic diathesis, and at the same time of the intestinal indigestion and rickets, consists in regulation of the diet. Human milk always quickly relieves this condition. A purely carbohydrate diet relieves it, but much less promptly and is, moreover, not suitable for a baby of this age. A return to cow's milk in any form, at any rate until a considerable time has elapsed, almost invariably causes a return of the symptoms. The only rational food for this baby is, therefore, human milk. If she cannot get it she must be given a starch and sugar solution for as long a time as is possible, due regard being paid to her general condition, and then quickly worked on to some modification of cow's milk.

It is possible that the administration of some of the calcium salts, like the lactate, may do good. The indications are so doubtful and the results to be expected so slight compared with those obtained from human milk that they are, however, hardly worthy of consideration. Parathyroid extract, in doses of one twentieth of a grain, three times daily, would seem a more rational treatment, but has not as yet been used enough to prove whether or not it is of benefit.

CASE 101. Florence F., who was nearly three years old, was the first child of healthy parents. She was born at full term, after a normal labor, was normal at birth and weighed ten pounds. She was nursed for thirteen months and then given at once whatever her parents ate. She had been perfectly well in spite of this, except for a convulsion, without known cause, when she was eighteen months old. She had had her adenoids removed when she was two years old.

She came in from her play about noon, February 14, vomited her breakfast and immediately had a severe convulsion. Her diet was then somewhat restricted, but was still too hearty for a child of her age. She had had five convulsions since then, one of which was preceded by vomiting. The bowels moved involuntarily in one of them and she slept for a long time after another. The convulsions had not occurred at any definite time in relation to the taking of food, and no connection between the convulsions and any special article of diet could be made out. Her appetite had continued good, her bowels had moved regularly and the stools had looked well digested. She had complained from the first, however, of pain in the abdomen and also of pain in the back of the head. She also often put her hands to her head. She had slept poorly at night and had been very fussy during the day. She was very feverish for several days after the first convulsion and again between March 22 and March 25. She had probably had some fever all the time, although her temperature had not been taken. She had run about as usual until the morning of the day she was seen, when she refused to either walk or stand. She was seen March 28.

Physical Examination. She was fairly developed and nourished, and of fair color. She was perfectly clear mentally, but fussy and hard to examine. There was no rigidity of the neck or neck sign. She both saw and heard. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. There was no coryza and the throat was normal. The tongue was slightly coated. The heart and lungs were normal. The abdomen was sunken and lax; nothing abnormal was detected in it. The liver and spleen

were not palpable. She would not stand or walk, but used her legs normally when lying down. There was no spasm or paralysis of the extremities. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100.4° F.; the pulse, 112; the respiration, 24.

The urine was of normal color, clear, acid in reaction, of a specific gravity of 1012 and contained neither albumin nor sugar.

The leucocyte count was 20,000.

Diagnosis. The improper diet, the association of some of the convulsions with vomiting and the pain in the abdomen and head point to some disturbance of the digestion as the cause of the convulsions. The fever is not inconsistent with this supposition. Against this explanation are the good appetite, the absence of vomiting except at the time of the convulsions, the normal and regular stools, and, to a less extent, the leucocytosis. The long continuance of the symptoms without the development of any physical signs of cerebral or meningeal irritation practically excludes all forms of meningitis and encephalitis. A cerebral tumor would not be accompanied by fever and pain in the abdomen, would not be likely to cause a leucocytosis and ought by this time to have produced some focal symptoms. Idiopathic epilepsy is not accompanied by fever, leucocytosis or pain in the head and abdomen. None of these explanations is, therefore, satisfactory. The leucocytosis and fever show that there must be a focus of inflammation somewhere. The physical examination has thus far failed to reveal its location and the normal condition of the urine rules out disease of the urinary tract. Inflammation of the middle ear is probably the most common cause of obscure fever at this age, is often accompanied by marked reflex symptoms and very frequently produces no symptoms to draw attention to the ear. It is usually preceded or accompanied by some symptoms of inflammation of the nose or throat, none of which are present in this instance. When this possibility is thought of, however, the pain in the head, the putting of the hands to the

head, the disturbed sleep and the irritability are found to be characteristic of it and to point toward it. The ears ought, therefore, to be examined. This was done and both drums were found to be red and bulging and the landmarks indistinguishable. OTITIS MEDIA is, therefore, undoubtedly the cause of the peculiar symptoms. The convulsions are reflex in origin; the pain in the abdomen is a referred pain, or, more probably, not in the abdomen at all, but merely a manifestation of the child's inability to locate pain.

Prognosis. The pain, restlessness and irritability will almost certainly cease as soon as the ears are opened. The temperature will soon drop to normal and there will be no recurrence of the convulsions.

Treatment. The treatment is immediate paracentesis of both drums, followed by syringing of the ears with warm water, three or four times daily.

CASE 102. John R., six months old, began to have a slight "cold in the head" February 15, but had no other symptoms. Three days later he was taken suddenly sick with fever, cough and difficulty in breathing. He lost his appetite, but showed no other symptoms of gastro-enteric disturbance. Swallowing seemed to cause discomfort. He apparently had no pain and did not put his hand to his ear. He was taken to a physician, February 21, who found the rectal temperature 104.2° F., the pulse 160 and the respiration 52. He sent the baby to the Infants' Hospital with the diagnosis of pneumonia. He was not seen and examined until the next day.

Physical Examination. He was a large, fat baby. His color was good. He took considerable interest in his surroundings. The alæ nasi did not move and the respiration was not grunting or painful, even when he cried. The anterior fontanelle was 3 cm. in diameter and level. There was no tenderness on pressure over the mastoids. There was no rigidity of the neck. The pupils were equal and reacted to light. There was a slight nasal discharge. The tongue was moderately coated. The throat was slightly reddened, but otherwise normal. The heart and lungs were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100° F., the pulse 115, the respiration 38.

The urine was pale, clear, acid in reaction, of a specific gravity of 1,012 and contained no albumin.

Diagnosis. The acute onset with fever, cough and difficulty in breathing and the relatively greater increase in the rate of the respiration over that of the pulse point strongly to pneumonia. His general appearance, the absence of motion of the alæ nasi and of grunting and painful respiration, the drop in the temperature and the normal condition of the lungs, while they do not exclude pneumonia, make it very improbable. Some other cause for the symptoms must be sought. The only place which has not been investigated is

the ear. The absence of pain, putting the hand to the ear and tenderness on pressure over the mastoids, does not count at all against otitis media. Pain is often absent in this disease. Babies seldom put their hands to their ears when they have otitis media and often do under other conditions. Tenderness over the mastoids is extremely rare in middle-ear disease at this age. Examination of the ears showed marked redness and some bulging of the right, and slight reddening of the left membrana tympani, showing that the trouble was OTITIS MEDIA.

Prognosis. The prognosis is good both as to life and the maintenance of normal hearing if the proper treatment is carried out. If the ear is opened early and proper drainage secured, extension to the mastoid, sinuses or meninges very seldom occurs at this age. If the drum is opened before it ruptures, it usually heals without a scar and leaves the hearing unimpaired.

Treatment. The right drum should be opened at once. The left should not be touched at present. Both ears should be syringed three or four times daily with warm water.

CASE 103. Joseph B., twenty-two months old, was seen in consultation July 22. He lived in a malarial district. He had always been delicate and pale. He had had a cough and a slightly elevated temperature since an attack of bronchitis in the early spring. He had seemed worse and the temperature had been higher and more irregular during the last two weeks. He had had a chill the night before, which was followed by a temperature of 105° F. and sweating. His appetite had been poor, but there had been no symptoms of indigestion, and the movements had been normal. Nothing abnormal had been found on physical examination except pallor and a slight enlargement of the spleen. The urine had shown nothing abnormal. An almost positive diagnosis of malaria had been made on the basis of the chill, fever and sweating, the enlargement of the spleen, the pallor and the apparent absence of any other cause for the symptoms.

Physical Examination. He was small and only fairly nourished. Pallor was marked. The anterior fontanelle was closed. He had twelve teeth. There was a slight nasal discharge and there was a little mucopurulent secretion in the nasopharynx. His tongue was moderately coated. There was a slight rosary. The heart and lungs were normal. The abdomen was rather large but lax. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was palpable 3 cm. below the costal border. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes.

The urine was pale, clear, slightly acid in reaction, of a specific gravity of 1,015 and contained no albumin or sugar. The sediment showed no formed elements.

BLOOD.

Hemoglobin,	42%
Red corpuscles,	4,560,000
White corpuscles,	30,000
Small mononuclears,	45.5%
Large mononuclears,	6.0%
Polynuclear neutrophiles,	47.5%
Eosinophiles,	1.0%

There was much variation in the size and shape of the red corpuscles, but no nucleated forms were seen. No plasmodia malariæ were seen.

Diagnosis. The leucocytosis and the absence of plasmodia at once exclude malaria. The rosary means a slight but unimportant amount of rickets. The blood has the characteristics of secondary anemia in infancy. The enlargement of the spleen is probably due to the same cause as the anemia. The continued irregular temperature and the chill suggest tuberculosis or confined pus. Tuberculosis at this age is rarely accompanied by chills, and it is unusual to have a high, irregular temperature without some physical signs of tuberculosis. Tuberculosis is, however, the most probable diagnosis unless some other cause for the symptoms can be found. The most common locality for confined pus in infancy, when it is not discovered on a routine examination, and when the urine is normal, is the middle ear. The nasal discharge and the mucopurulent secretion in the nasopharynx suggest, in this instance, the possibility of an infection of the middle ear. An examination of the ears showed bulging and reddening of both membranæ tympanorum. Paracentesis showed pus in both middle ears. The diagnosis is, therefore, OTITIS MEDIA.

Prognosis. The prognosis is good. The temperature will gradually work down to normal and the general condition improve. There is but little chance of extension to the mastoid cells or to the sinuses. Hearing will probably not be impaired.

Treatment. Now that the ears have been opened, the treatment is syringing with warm water, three or four times daily, until the discharge has ceased and the incisions have healed.

SECTION VII.

DISEASES OF THE BRONCHI, LUNGS AND PLEURÆ.

CASE 104. John J., three years old, started in with a "cold in his head" and cough, January 10. The nasal discharge diminished and the cough became drier on the 12th. He did not seem at all sick until the 13th. The cough was then much more severe and apparently painful. His appetite was poor and he appeared feverish.

Physical Examination. He was well developed and nourished. His cheeks were flushed. There was a slight nasal discharge. The ear drums were normal. The whole throat was moderately reddened, but there was no enlargement of the tonsils and no exudation. His tongue was slightly coated. The lungs showed nothing abnormal except a few sibilant and sonorous râles scattered throughout both chests, both back and front. The heart was normal. The abdomen was normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100.8° F., the pulse 132, the respiration 34.

Diagnosis. The diagnosis is, of course, BRONCHITIS.

Prognosis. The prognosis at present is perfectly good. The only danger is of a consecutive bronchopneumonia. This ought not to develop if he has proper care and treatment.

Treatment. The treatment of bronchitis depends on the stage of the bronchitis and the condition of the bronchial mucous membrane. The bronchitis in this instance is in the early stage. The bronchial mucous membrane is congested, dry, swollen and reddened, and consequently there is but little secretion. The object of the treatment at this stage is to relax the mucous membrane and in this way increase the secretion. The drugs which will do this are the so-called

" sedative " expectorants. These are tartar emetic, apomorphin and ipecac. The only one of these which is safe to give to children is ipecac. This may be given as the wine or syrup. It should be given in water, not mixed with syrups, which are inert and disturb the digestion. The object of the ipecac is to cause relaxation of the mucous membrane, not nausea or vomiting. From five to ten drops every two hours is about the right dose for this boy. The alkalies have somewhat the same action and may be used instead of ipecac. A moist atmosphere also tends to moisten and relax the bronchial mucous membrane. It will be well, therefore, to have a vessel of boiling water or a " croup-kettle " near him.

The object of the sedative expectorants is to relax the bronchial mucous membrane and in this way to hasten the cure of the disease. Their dosage and the length of time that they are given must be regulated by the condition in the bronchi, as revealed by physical examination. They are not given for the symptom, cough, and in using them, therefore, the amount of coughing must not be considered. The symptom, cough, is best controlled by some preparation of opium. The safest form of opium for a child is paregoric. This boy may have from five to fifteen drops every two or three hours for the cough if it is troublesome. This also should be given in water, not in syrup. The ipecac and paregoric must not be combined in the same prescription, because they are given for entirely different purposes, and it is necessary to be able to give either one without giving the other. He needs the ipecac constantly; he may need the paregoric only occasionally.

It will be well to give him a tablespoonful of castor oil, or one or two teaspoonfuls of syrup of senna at once. The diet should be liquids and soft solids. It will be much wiser for him to stay in bed. He should have plenty of fresh air, but will probably be more comfortable if the temperature does not go below 60° F.

CASE 105. Henry L., twenty-six months old, had always been well, except for an occasional slight attack of indigestion. He was taken sick, January 16, with fever and cough. His temperature had varied between 100° F. and 104° F. ever since and the cough had continued. The cough, which was at first dry, had, however, become loose. The physician who had had charge of him said that he had bronchitis and gave him ipecac and inhalations of compound tincture of benzoin. He had taken his food poorly, but had not vomited and had had normal stools. He was seen at 9 A.M., January 22.

Physical Examination. He was well developed and nourished, but a little pale. He was sitting up in bed, playing with his toys, but coughed frequently. The cough was loose. He had no coryza and his voice was clear. The pharynx was slightly reddened. The ear drums were normal. The heart was normal. There were a moderate number of medium and coarse moist râles on both sides behind and a few in front. The lungs were otherwise normal. The abdomen was negative and the liver and spleen were not palpable. The extremities were normal. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100° F.; the pulse, 124; the respiration, 40.

Diagnosis. He has an uncomplicated BRONCHITIS.

Prognosis. The prognosis is good, barring the possibility of a consecutive bronchopneumonia. This ought not to develop, if he has proper care and treatment.

Treatment. The treatment of bronchitis depends on the stage of the bronchitis and the condition of the bronchial mucous membrane. The bronchitis in this instance has passed the early stage. The bronchial mucous membrane is still somewhat swollen and reddened, but is no longer dry. It is relaxed and is secreting moderately freely. It is time, therefore, to stop the ipecac, which is a sedative expectorant, and give one of the so-called "stimulant" expectorants to aid the mucous membrane to clear itself of the products of inflammation within it and to restore its tone. The best of them is the chloride of ammonium. One-half of a grain every two hours will be enough for him. The taste is best dis-

guised by the fluid extract of licorice. The following prescription is a suitable one:

Chloride of ammonium	gr. xii
Fluid extract of licorice	ʒ ii
Water ad	ʒ iv

Sig. One teaspoonful every 3 hours.

The chloride of ammonium is given for its action on the bronchial mucous membrane, not directly for the symptom, cough, and should, therefore, be given continuously. If his cough is very troublesome, he may be given five or ten drops of paregoric, in water, every two or three hours to control it. The paregoric should not be given any oftener than is necessary, however, because, if it is given too freely, it will prevent him from clearing his tubes thoroughly and will thus do harm. It will be well to continue the vaporization of the compound tincture of benzoin, although it is usually less effective in this than in the early stage.

He should have plenty of fresh air, but will probably be more comfortable if the room does not go below 60° F. He should stay in bed. His diet should consist of milk, junket, cereals, milk toast, bread, broth and custard.

CASE 106. Mary J., nine months old, had always been a well, strong baby. She began to have a little running from the nose March 1. March 3 she began to cough a good deal and to have a little fever. March 4 she had more fever, coughed a great deal and had considerable rattling in the chest. She took but little food, but digested that little well. She grew rapidly worse and was seen in consultation the night of March 5.

Physical Examination. She was well developed and nourished, but markedly cyanotic. The alæ nasi moved with respiration. She was unable to lie down and was very restless. The examination was superficial because of her critical condition. The throat showed nothing abnormal. The cardiac area was not determined; the action was regular, the sounds feeble. There was sinking in of the supraclavicular and lower intercostal spaces, as well as of the epigastrium, with each inspiration. There was vesicular resonance all over the lungs. The respiratory sound was feeble, but normal in character. The vocal resonance was not determined. Both chests were full of fine and medium moist râles, the fine predominating. The râles were easily palpable. The extremities were cold and the whole body covered with perspiration. The temperature was not taken. The pulse was faster than could be counted. The respiration was 80.

Diagnosis. The diagnosis is, without question, BRONCHITIS. The finer and medium-sized tubes are involved to a much greater degree than the larger.

Prognosis. The condition is a very critical one and, while not hopeless, the chances are very much against recovery. She will probably not live twenty-four hours. If she does, her chances are somewhat better.

Treatment. Her condition is critical and the treatment must be immediate and energetic. The first indication is to clear out the bronchial tubes. Alternate dippings in water from 105° F. to 110° F. and from 65° F. to 75° F., as is done in resuscitating new-born infants, will probably make her cry, breathe deeply and cough, and in this way get rid of the excessive secretion. If this method is not successful, the wine or syrup of ipecac, in teaspoonful doses, will make her vomit

and in this way clear out the bronchial tubes. She must then be given plenty of fresh air and, if necessary, oxygen. The oxygen is given for the symptom, cyanosis, and must be given continuously as long as the cyanosis lasts, not intermittently as it usually is. The dippings and ipecac may be repeated as necessary. It must not be forgotten, however, that ipecac used in this way is depressing and, consequently, a dangerous remedy. If the dippings and ipecac do not relieve her, atropin, in doses of 1-500 grain, may be given subcutaneously with the object of diminishing the secretion.

She also needs immediate stimulation. Strychnia is a respiratory as well as a cardiac stimulant and is, therefore, doubly indicated. It should be given subcutaneously, in doses of 1-300 grain, every two or three hours, as necessary. Caffeine-sodium benzoate, or salicylate, in doses of from one eighth to one fourth of a grain, given subcutaneously, will also aid in keeping up the heart.

She should be fed every two hours, and will probably not take more than an ounce at a time, if she does that. She will probably not be able to take the bottle. The best way to give the food is with a Breck feeder. If she will not take it in this way, a dropper or spoon may be tried. Human milk is the best food for her; next to this, a weak modified milk, for example, one containing 2% of fat, 6% of sugar, 0.75% of whey proteids and 0.25% of casein.

CASE 107. Clifton R., two years old, had always been well. Four days before he was seen, while eating dried figs in a room with his brother who was playing with some nails, he suddenly began to cough and choke. His mother picked him up by the heels and slapped his back and he vomited his last meal together with a quantity of figs. He continued to cough almost constantly and at times had attacks of choking. He coughed up what was thought to be a piece of fig early the next morning during one of these attacks. There was, however, no improvement in the symptoms after it. The temperature went up to 102° F. on the third day and at his entrance to the Children's Hospital the next day was 103° F. He had eaten very little for two days, but had had no difficulty in swallowing and had shown no symptoms of indigestion.

Physical Examination. He was well developed and nourished, but a little pale. He was clear mentally. There was no nasal discharge and he kept his mouth shut. The throat showed nothing abnormal to either inspection or palpation. The ear-drums were normal. He was short of breath, but was able to lie down. His voice was clear. There was no dullness under the manubrium and the thymus was not palpable above it. There was no increased dullness in the middle back and the bronchial voice sound was not heard below the seventh cervical spine. The heart was normal, except that the second pulmonic sound was slightly accentuated. The chest was symmetrical, but the left side moved less in respiration than the right. The respiratory sound was much diminished over the whole left chest, but normal in character. The voice sounds and fremitus were slightly diminished on the left side and an occasional dry râle was heard on that side, both in front and behind. There was no change in the percussion note. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen, genitals and extremities were normal, as were the deep reflexes. The rectal temperature was 103° F.; the pulse, 136; the respiration, 40.

The urine was pale, acid in reaction and contained no albumin or sugar. The sediment showed a few leucocytes, small round and squamous cells.

A Roentgenograph showed no foreign body in either the trachea or bronchi.

Diagnosis. The physical examination shows nothing in the nose, nasopharynx, throat or larynx to account for the symptoms, and there are no signs of enlargement of the thymus or bronchial lymph nodes which might cause pressure on the trachea or bronchi from without. The physical signs are inconsistent with solidification of the lung or an accumulation of fluid. The râles do not show a sufficient amount of bronchitis to account for the severity of the symptoms. The sudden onset of the coughing and choking points very strongly to the inhalation of some foreign body, in this instance either a piece of fig or a nail. The normal condition of the throat and the clear cry prove that it cannot be located above the trachea. The fact that less air enters the left chest than the right and that the respiratory sound is diminished equally over the whole left side show that the FOREIGN BODY must have passed through the trachea and lodged IN THE LEFT PRIMARY BRONCHUS. The absence of a shadow in the Roentgenograph shows that it cannot be a nail. It must, therefore, be a piece of fig, which would not give a shadow. The rise in temperature indicates that there has been an infection of the bronchus; the râles, a secondary bronchitis or an accummulation of the bronchial secretions from inability to clear the tubes properly.

Prognosis. The prognosis is very grave unless the piece of fig can be removed very soon. It may soften and be coughed up before much damage has been done to the bronchus. The fever shows, however, that considerable harm has already been done. The chances are, therefore, that before it is expelled an abscess or gangrene of the lung will have developed which will eventually cause death.

Treatment. Bronchoscopy should be done at once by a thoroughly competent man, and, if the piece of fig can be seen and grasped, it must be removed. If it cannot be removed, there is little to do at present except to look after the general condition. If evidences of abscess or gangrene of the lung develop, an attempt should be made to reach it from the outside. Even if the operation is successful, he will, however, probably not recover.

CASE 108. Benjamin A. was seen in August, 1909, when seven years old. His father was rheumatic; his mother and four other children were well. He had had measles and whooping-cough when two years old and chicken-pox at six years. He had had an operation for the removal of adenoids in 1906 and another in 1908. One tonsil was also supposed to have been removed at the latter operation. In April, 1907, when at his home in Mt. Vernon, Ohio, he had a very severe attack of asthma, lasting several weeks. He had another severe attack in July, 1907, while visiting at Port Huron. He then went to the island of Mackinac, where he was immediately relieved. He spent the summer there and had only one slight attack. During the winter of 1907–08, which was spent in Mt. Vernon, he had many slight attacks, which continued during the spring of 1908, when he was in Jacksonville, Ill. He passed the summer in the Rocky Mountains at an altitude of 6000 feet and was perfectly well. He slept out of doors at home during the winter of 1908–09 and had only a few mild attacks. About a week before he was seen, while at Bass Rocks, Mass., he had the most severe attack since the first one. He had been fairly well between the attacks, but always kept his mouth open and snored at night. He was rather indiscreetly fed and was subject to mild attacks of indigestion. His mother thought that some of the attacks of asthma were brought on by indigestion and that she had been able to abort some of them by giving calomel at the beginning. She had not been able to trace any connection between the attacks and any special article of food.

Physical Examination. He was well developed and nourished and of good color. He kept his mouth open and had a typical adenoid face. A considerable amount of soft adenoids was felt with the finger. The tonsils were much enlarged and did not look as if they had ever been touched. The tongue was nearly clean; the teeth were good. The area of cardiac dullness was normal, while the area of flatness was much diminished. The heart sounds were normal. The respiration was somewhat wheezy and expiration was prolonged. The chest was everywhere hyperresonant. The respiratory sound was normal in character, but the expiration

was prolonged. There was no change in the vocal resonance or fremitus. A moderate number of sibilant râles was heard on both sides, both behind and in front. The upper border of the liver flatness was at the upper border of the eighth rib in the nipple line; the lower border was not palpable. The spleen was not palpable. The abdomen showed nothing abnormal. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

Diagnosis. The wheezy respiration, prolonged expiration and sibilant râles confirm the diagnosis of ASTHMA, which was made by his former physicians. The hyperresonance of the chest, the diminution of the area of cardiac flatness and the displacement of the lung-liver boundary downward show that there is a moderate degree of EMPHYSEMA OF THE LUNGS. He also has ADENOIDS and CHRONIC HYPERTROPHY OF THE TONSILS.

Prognosis. The prognosis in this, as in all cases of asthma, is indefinite. There is no way of finding out whether he will continue to have attacks all his life or whether they will sooner or later cease. The chances of recovery are, however, better than they would be if he was an adult. The outlook is more favorable than usual in this instance, moreover, because there is an abnormal condition in the throat which may be at the bottom of the trouble. If this is so, the removal of the tonsils and adenoids will probably stop the attacks. If the asthmatic attacks cease, the emphysema will diminish and what remains will be corrected through the changes incident to the growth of the lungs.

Treatment. The adenoids and tonsils should be removed at once. He should then be taken to a high and dry climate, where experience has shown that he does best. It will be wiser for him to remain away from home for a year but, if this is not feasible, he should sleep out of doors as he did last winter. There are no definite indications as to diet, as he has little or no disturbance of the digestion and no connection between the attacks and any special articles of food has been made out. He should be given a reasonable, simple diet for his age. It will be well, in addition, to cut eggs out of his

diet, as in many instances they seem to predispose to, or bring on, the attacks. If the attacks persist after the removal of the tonsils, it will be well to try the effect of iodide of potassium, given over considerable periods of time, in doses of from three grains to five grains, three times daily, after meals. It is best administered in essence of pepsin. The syrup of hydriodic acid may be used if desired. The objection to it, however, is that, as a teaspoonful represents only a little more than one grain of the iodide of potassium, the quantity of syrup which has to be given in order to give enough of the iodide is liable to disturb the digestion.

He will probably be most comfortable during an attack in a room at from 66° F. to 68° F., with the air somewhat moist. Nitrate of potassium paper or some of the various asthma powders should be burned in the room. These powders are all more or less similar in their composition, being, as a rule, made up of various combinations of nitrate of potassium, belladonna, hyoscyamus and stramonium leaves and opium, yet one combination is most effectual in one case and another in another. It will be well, therefore, to try different combinations until one is found which relieves him. It will also be advisable to try the subcutaneous injection of from three to five minims of the 1–1000 solution of adrenalin chloride, which in some instances is very efficacious. If these measures do not relieve him, it may be necessary to give him a few whiffs of chloroform or a subcutaneous injection of morphia. It will be wise to give him one thirty-second of a grain first; if this does not relieve him, the dose may be increased to one-sixteenth or even to one-eighth of a grain.

CASE 109. Winthrop W.'s mother had had asthma when a child. His sister, about two years older than he, had eczema when a baby, and began to have attacks of asthma, which were not stopped by the removal of the tonsils and adenoids, when she was three and one-half years old.

He was well as a baby, except for repeated "colds," which were less frequent after the removal of his adenoids, when he was fourteen months old. He had a very severe attack of laryngeal diphtheria, requiring intubation, when he was eighteen months old, after which he had repeated attacks of catarrhal laryngitis and many "colds." His tonsils and a small amount of adenoids were removed when he was four years old. The "colds" and attacks of laryngitis were, however, as frequent and as severe as before. He was seen in one of these attacks when four and one-half years old. He had had a little coryza, accompanied by a tight cough and a little hoarseness, the day before, but had slept well. He began to choke up rather quickly at 9 A.M. and was seen at 11 A.M.

Physical Examination. He was well developed and nourished. His color was good. He was able to lie down, but breathed much more easily when sitting up. There was a little nasal discharge and the throat was generally reddened. His voice was clear. The heart was normal. The pulmonary resonance was normal and the respiration vesicular. Expiration was, however, much prolonged. There was no change in the vocal resonance or fremitus. A few sibilant râles were heard over both lungs, both in front and behind. There was no retraction of the intercostal spaces or epigastrium with inspiration. The abdomen was normal. The upper border of the liver flatness was in the fifth space in the nipple line; the lower border was not palpable. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99.4° F.; the pulse, 110; the respiration, 18.

Diagnosis. The sudden onset of difficult respiration suggests some affection of the larynx, either catarrhal or diph-

theritic. The clear voice, the absence of retraction of the intercostal spaces and epigastrium and the prolonged expiration exclude it. The sibilant râles show that there is a slight BRONCHITIS. The bronchitis does not, however, explain the prolonged expiration, and the difficulty in breathing is out of proportion to the signs of bronchitis. The only condition with which this combination of physical signs, sibilant râles, prolonged expiration and difficult respiration, is consistent is ASTHMA.

Prognosis. The prognosis in this, as in all cases of asthma, is indefinite. He may continue to have attacks all his life or they may sooner or later cease. The chances of recovery are, however, much better than they would be if he was older. The facts that the attacks have persisted in spite of the removal of his tonsils and adenoids and that his sister also has asthma make his chances somewhat less favorable than the average.

Treatment. The temperature of the room should be kept between 66° F. and 68° F. A dish of water on which compound tincture of benzoin has been poured should be kept boiling constantly, and ten drops of the wine of ipecac and ten drops of sweet spirit of nitre given every hour. If this treatment does not relieve him, nitrate of potassium paper or one of the various asthma powders may be burned in the room (see Case 108) or from two to three minims of the 1–1000 solution of adrenalin chloride given subcutaneously. If these methods are ineffectual, he may be given one twenty-fourth of a grain of heroin by mouth, or, if necessary, a few whiffs of chloroform or a subcutaneous injection of one forty-eighth of a grain of morphia. This dose may be increased to one thirty-second or even to one-sixteenth of a grain, if necessary.

After the attack is over, it will be well to give him two or three grains of the iodide of potassium, three times daily, for a considerable time (see Case 108). He should be given a simple, reasonable diet for his age. It will also be well to cut out eggs. It is also important to keep his bowels well open. If the attacks continue to recur, a change of climate should, if possible, be tried. In this instance, as in most

others, there are no definite indications as to what climate will help him, except that, as he is living in Boston, it will be well to try first some high, dry, inland locality. The selection of a climate must be, however, largely a matter of experiment.

CASE 110. Lizzie O., four years old, began to cough early in April. She began to whoop in about a week. She was but little depressed by the whooping-cough and got on very well until about the first of May. The cough then became worse, she lost her appetite and failed in flesh and strength. She began to be feverish and on May 6 went to bed. From that time she grew rapidly worse. She had frequent paroxysms of whooping and much cough without whooping. She raised a good deal of mucopurulent sputum. She was unable to lie down with comfort the night of May 8 and was more or less blue. She took almost no nourishment and was very restless. She was seen in consultation May 9.

Physical Examination. She was fairly developed and nourished but had evidently lost considerable weight. She was bolstered up by pillows in a reclining position as she was unable to lie flat. There was marked cyanosis of the face and extremities. The alæ nasi moved with respiration. She appeared very sick. Examination of the throat showed nothing abnormal. There was no retraction of the supraclavicular or intercostal spaces, but a little of the epigastrium. The cardiac impulse was diffuse; the apex in the fifth space just outside the nipple line. The upper border of relative dullness was at the lower border of the second rib; the right border nearly at the right parasternal line. The first sound was short and rather feeble, and at the mitral area was followed by a soft blowing murmur. The second pulmonic sound was no louder than the second aortic. There was dullness on percussion in the lower left back below the angle of the scapula, and extending outward from the spinous processes to the scapular line. In this area the respiration was bronchial in character, but diminished in intensity. The vocal resonance and fremitus were increased. There were numerous high-pitched, fine and medium moist râles. In the right axilla, at about the level of the sixth rib, there was an area of dullness about the size of a silver dollar. Respiration was here bronchovesicular and accompanied by many fine, moist, high-pitched râles. Elsewhere respiration was normal in character, but diminished in quantity. There were many medium and coarse moist râles throughout both chests. The abdomen

showed nothing abnormal. The liver and spleen were not palpable. The extremities were normal. The knee-jerks were equal and normal. There was no edema and no enlargement of the peripheral lymph nodes. The rectal temperature was 104° F., the pulse 200, and the respiration 88.

Diagnosis. The signs of bronchitis and the presence of two separate areas of solidification in the lungs prove that she has a BRONCHOPNEUMONIA. There is nothing about the physical signs to show whether this is or is not tubercular. While it is true that whooping cough, more than any other disease except measles, predisposes to the development of tuberculosis, the infection far more often takes the form of a bronchial adenitis than of a bronchopneumonia. Non-tubercular bronchopneumonia is very common in whooping cough; tubercular, very rare. The chances are, therefore, very much in favor of its being non-tubercular. The finding of tubercle bacilli in the sputum would, of course, prove it to be tubercular; their absence would not exclude tuberculosis. The process is so acute that the skin tuberculin test would probably be negative even if it is tubercular. The white blood count would not help because, even if the bronchopneumonia is primarily tubercular, there is almost certainly a secondary infection which will cause a leucocytosis. It is of no importance anyway, in her present condition, to make a diagnosis between the two forms, because it will make no difference in the treatment.

The diffuse cardiac impulse, the enlargement of the heart upward and to the right, the short, feeble first sound, and the diminution of the second pulmonic sound (the second pulmonic sound is normally louder than the second aortic at this age) show marked weakness and dilatation. The systolic murmur at the apex is almost certainly due to a relative insufficiency of the mitral valve, as there is no reason to suspect an endocarditis, and the dilatation of the heart is amply sufficient to account for an insufficiency. It is impossible to determine whether the dilatation of the heart is due to the strain of coughing, to a myocarditis in connection with the bronchopneumonia, or to both. The chances are that it is largely due to the strain of coughing, which falls on the right side of

the heart, since only the right side of the heart is enlarged, while the enlargement is usually more uniform in myocarditis. It is very probable, however, that there may be a small myocarditic element.

Prognosis. She is in a very serious condition. She has hardly reached the height of her whooping-cough, she has bronchopneumonia and her heart is dilated. She has a chance of recovery, but only a small one.

Treatment. The first thing to do is to favor oxygenation of the blood by giving her a liberal supply of fresh air. At this time of year she may be put out of doors or by the open window. If fresh air does not relieve the cyanosis, she must be given oxygen. The indication for oxygen is cyanosis. She should, therefore, be given oxygen continuously as long as she is cyanotic, not intermittently, as is usually done.

The next indication is to stimulate the heart. Her condition demands a quick stimulant at once. Sulphate of strychnia in doses of 1-120 grain, or caffeine-sodium benzoate or salicylate, in doses of one half a grain, repeated every two hours to every four hours, as necessary, are the best drugs. Aromatic spirits of ammonia, in fifteen-drop doses, may tide over an emergency. She also needs a cardiac tonic to strengthen and build up the heart wall. Digitalis is the best of the cardiac tonics. Five drops of the tincture every four hours will be none too much for her at present. If the digitalis takes hold, the strychnia and caffein may be diminished or omitted. She should be fed every two hours with small amounts of milk and soft solids, such as custard, junket, smooth cereals, blanc mange and ice cream.

The results of the treatment of whooping-cough are at best most unsatisfactory. To do good, the drugs must be given up to their physiological limit. In such doses they will certainly do harm in this instance. If the lungs are not too much filled up, there is no objection to giving morphia, in doses of from one thirty-second to one twenty-fourth of a grain, to control excessive cough, nervousness, sleeplessness and discomfort.

CASE 111. William R., twenty-three months old, was the third child of healthy parents. The other children were well. There had been no deaths or miscarriages. He had had no known exposure to tuberculosis. He was not nursed, but had been artificially fed from the first by his mother without professional advice. He had a severe attack of diarrhea, lasting a month, when six months old. Since then he had been pale and delicate and had had frequent attacks of indigestion.

He broke out with measles, March 18. The attack was a light one and he seemed all right, March 23. Two days later, however, he began to cough and seemed feverish. He was seen by his physician March 27. His rectal temperature was then 102° F., his pulse 150 and his respiration 50. There were many moist râles in both sides of the chest, but no signs of solidification. The temperature was higher the next day, but he gradually improved up to the morning of April 1, the temperature having dropped to 102° F., the pulse to 130 and the respiration to 40, while the cough had diminished. Since then his temperature had ranged between 103° F. and 104° F. and his respiration had become more rapid, while expiration was accompanied by a moan. He had taken his food reasonably well, had not vomited and had had normal movements from the bowels, but had, nevertheless, failed considerably in general condition. He had been quiet, except when coughing, and had slept the greater part of the time. His mother had refused to open the windows or to force him to eat. He was seen in consultation at 11 A.M., April 2. He was found in a small room with double windows, the windows and doors being shut tight and the shades pulled down.

Physical Examination. He was small and poorly nourished. He was markedly pale, but not at all cyanotic. He was feeble, but conscious. He had sixteen teeth. There was no nasal discharge and the throat was normal. The tongue was moderately dry and considerably coated. The cardiac impulse was neither visible nor palpable. The left border of the cardiac dullness was six cm. to the left of the median line, the upper border at the lower border of the second rib, and the right border two cm. to the right of the median line. The

first sound was of fair strength. The second sound at the pulmonic area was moderately accentuated. There were no murmurs. A few medium and coarse, moist râles were heard over the left lung, both in front and behind. There was moderate dullness with diminished respiration over the right lower lobe. The respiration was normal in character, except in a small spot in the axilla, where it was broncho-vesicular. The voice sounds and tactile fremitus were not changed. Very many fine, moist râles were heard over the whole right lower lobe, and a moderate number of fine and medium, moist râles over the upper and middle lobes. The abdomen was normal. The lower border of the liver was just palpable in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal, but diminished. There was no enlargement of the peripheral lymph nodes. His rectal temperature was 104° F.; his pulse, 160; his respiration, 72.

Diagnosis. The râles show that there is a general BRONCHITIS. The dullness, diminished respiration and fine, moist râles over the right lower lobe show that there is an exudation into the alveoli and beginning solidification. The broncho-vesicular respiration in the axilla shows that the process has in this spot gone on to complete, or nearly complete, solidification, that is, that there is also a BRONCHOPNEUMONIA. The accentuation of the second pulmonic sound is due to the increased pressure in the pulmonary circulation resulting from the obstruction to the flow of blood through the lungs. The process in the lungs may be either tubercular or non-tubercular. The physical signs are equally consistent with either condition. The absence of any known exposure to tuberculosis does not count especially against a tubercular bronchopneumonia, because every baby is exposed to tubercular infection many times before it is two years old. Measles is, moreover, more likely than any other disease, except whooping-cough, to light up a latent tubercular focus. Simple bronchopneumonia is, however, very common, while tubercular bronchopneumonia is relatively rare. The chances are, therefore, that he has a non-tubercular bronchopneumonia. The sputum can probably be obtained without much difficulty

by introducing a cotton swab into the pharynx and making him cough. The finding of tubercle bacilli in the sputum will make the diagnosis of tuberculosis positive. Tuberculosis cannot be excluded, however, if they are not found. A skin tuberculin test may also be tried. If it is negative, tuberculosis can be practically excluded; if it is positive, a probable diagnosis of tubercular bronchopneumonia is justified.

Prognosis. He is seriously ill. The facts that he has always been delicate and has never had a good digestion are against him. On the other hand, however, there are no evidences of cardiac weakness, there are no signs of solidification except in the right lower lobe, his digestion is now good, he is willing to take food and he is clear mentally. He has, moreover, not had any fresh air or proper nursing. It is reasonable to expect that he will do better when these are provided, as they must be. The chances are, therefore, considerably in his favor.

Treatment. The first and most important thing in the treatment is to move him into a room without double windows, push up the shades, open the windows and give him a large amount of fresh air and sunlight. The next thing to do is to get a capable nurse to keep the windows open and the shades up, and to make him take his food. He should be fed every three hours with milk and starchy foods. He may also have orange juice, if he likes it. His temperature is not very high, is not causing any disturbance of the nervous system, and, therefore, requires no treatment. There are no evidences of cardiac weakness. Stimulants are consequently not needed. The fresh air will almost certainly relieve his cough. There are no drugs which will help the bronchopneumonic process in the lung. The bronchitis is not very severe and he is clearing his tubes well. There is, therefore, no urgent need of expectorants, which are, moreover, more likely to disturb his digestion than to alleviate the pathological condition in the bronchi. It will be wiser, therefore, not to give them to him.

CASE 112. Andrew D., seven months old, was the third child of healthy parents. The other children were well and there had been no miscarriages. There was no tuberculosis in either family and there had been no known exposure to it. He was born at full term, after a normal labor, was normal at birth and weighed seven and one-quarter pounds. He had always been well, except for a very mild attack of whooping cough, from which he had recovered, a month before. He was nursed for several months and did very well. Since then he had been given a mixture of three parts of whole milk and one part of water, to which Mellin's Food had been added. He had thrived on that as well as he had on the breast-milk.

He had a convulsion, followed by fever, the morning of April 11. His temperature had been about 103° F. since then and he had had four more convulsions, the last one during the evening of the eleventh. He was given castor oil immediately after the first convulsion and had had several loose, green, curdy stools as the result. He had not vomited, coughed, or shown any evidences of pain. He was seen in consultation at 5 P.M., April 12.

Physical Examination. He was fairly developed and nourished, and of fair color. He was clear mentally. The anterior fontanelle was three cm. in diameter and level. There was no rigidity of the neck or neck-sign. The pupils were equal and reacted to light. The ear drums were normal. There was no nasal discharge, but the pharynx was slightly reddened. The cardiac impulse was indistinctly palpable six cm. to the left of the median line. The left border of the cardiac dullness corresponded to the impulse. The right border was two cm. to the right of the median line; the upper border was in the third space. The action was regular and the sounds normal. The second pulmonic sound was slightly accentuated. The respiration was rapid and grunting and the alæ nasi moved. The left chest did not move quite as much as the right and the respiratory sound was not quite as loud in the left back as elsewhere. Nothing else abnormal was detected in the lungs. The level of the abdomen was that of the thorax. It was everywhere tympanitic and there was no tenderness or spasm. The lower border of the liver

was palpable one cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes and no eruption. The rectal temperature was 103° F.; the pulse, 140; the respiration, 72.

Diagnosis. The sudden onset, the continued high fever and the relative increase in the rate of the respiration over that of the pulse (1 to 2 instead of the normal 1 to 4) are sufficient, in the absence of all physical signs of other diseases, to justify an almost positive diagnosis of PNEUMONIA. The diminution of the motility and of the respiratory sound on the left side, which are not infrequently the earliest physical signs of pneumonia, are sufficient to make this diagnosis certain. The grunting respiration and the motion of the alæ nasi are corroborative evidence. The absence of cough does not count materially against pneumonia, because cough is often absent in the early days of pneumonia in infancy. Meningitis, which is suggested to a certain extent by the continuance of the convulsions, can be excluded on the level fontanelle and the absence of all physical signs of cerebral irritation. The loose, green stools are undoubtedly due to the castor oil, together with some disturbance of the digestion from the fever.

Prognosis. He is not at present dangerously ill. This is only the second day of the disease, however, and he would naturally not show much constitutional depression at this time. It is too early, therefore, to give any definite prognosis. Pneumonia is, however, a very serious disease in infancy, very different from what it is in childhood. The prognosis should, therefore, be guarded. All that can be said is that he is doing well now and that it is impossible to say whether he will recover or not.

Treatment. See Cases 113 and 114. His temperature is not unduly high and he has shown no evidences of disturbance of the nervous system for nearly twenty-four hours. The fever, may, therefore, be disregarded. There is no disturbance of the heart or circulation. Stimulation is, there-

fore, contraindicated. He has been doing well on his present food. It will not be well to change it now that he is sick, although it is not an ideal one. It will be advisable, however, to dilute it one-half with water. He should be given eight feedings of four ounces, at intervals of three hours. He should also be given water freely.

CASE 113. Michael D., seven years old, went to school on the morning of January 24 perfectly well, as far as was known, except that his bowels had not moved for nearly a week. While playing at recess one of his playmates struck him in the abdomen with his fist. Shortly afterward he became faint and nauseated and was sent home by his teacher. He vomited soon after reaching home and continued to do so for twenty-four hours. He was given two grains of calomel in divided doses during the afternoon and night of the 25th, and a teaspoonful of Epsom salts the next morning, but his bowels had not moved. He continued to complain of nausea, headache and pain in the abdomen. The abdominal pain was general, not localized. He had coughed a little since the morning of the 26th. He had felt very hot, but his temperature had not been taken. He had not been delirious. He was seen about 4 P.M., January 26.

Physical Examination. He was fairly developed and nourished. He was perfectly clear mentally. The cheeks were flushed. His face was not pinched. The alæ nasi moved with respiration. The tongue was moist and moderately coated. The throat was slightly reddened, but was otherwise normal. The cardiac impulse was in the fifth space, just inside the nipple line. The right border of dullness was 1 cm. to the right of the right sternal border, the upper border at the middle of the third rib. The sounds were normal. The second pulmonic sound was somewhat the louder. There was slight dullness in the right back below the angle of the scapula with slightly diminished respiration of normal character. The vocal resonance and fremitus were normal. There were no râles. The upper border of the liver flatness was at the upper border of the sixth rib, the lower border was not palpable. The spleen was not palpable. The level of the abdomen was considerably above that of the thorax; it was everywhere tympanitic. There was no muscular spasm, but the whole abdomen was somewhat tender, the tenderness being most marked in the right iliac fossa. There was, however, no tumor or dullness in this region. There were no evidences of free fluid in the abdomen. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and diminished;

there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. Rectal examination showed nothing abnormal beyond a mass of hard feces in the rectum. The rectal temperature was 104° F., the pulse 140, the respiration 60.

The urine was high in color, extremely acid in reaction, and of a specific gravity of 1,030. It contained no albumin or sugar, but a large excess of urates. The sediment showed nothing abnormal.

The leucocyte count was 36,000.

Diagnosis. The history of the acute onset of vomiting and pain in the abdomen immediately after a blow in that region makes some acute inflammatory condition in the abdomen seem the most obvious diagnosis. The persistent constipation, the continuance of the pain and the abdominal distention and tenderness all corroborate this diagnosis. The greater tenderness in the right iliac fossa points to an involvement of the appendix. Further consideration, however, makes this diagnosis seem less probable. The absence of the pinched face, of free fluid in the abdomen and of muscular spasm makes general peritonitis very improbable. The absence of localized spasm, tumor and dullness in the right iliac fossa and the negative results of the rectal examination practically rule out appendicitis. The blow of another small boy could hardly rupture any organ, there was no collapse and there are no signs of peritonitis, as would be expected if any organ had been ruptured fifty-three hours before. The condition of the urine also counts against any injury to the kidney. The history of constipation before the injury and the mass of hard feces in the rectum suggest that constipation may be the cause of the abdominal symptoms, and that they, and perhaps the blow as well, may be purely coincidences and that the real trouble is located somewhere else.

The cough suggests some trouble in the lungs. It is a well-known fact that the pain in pneumonia is often referred by children to the abdomen and that distention of the abdomen is very common in pneumonia at this age. Localized diminution of the respiratory sound is often the earliest sign of pneumonia. When associated with dullness, as in this instance, it

is most suspicious. The relative increase in the rate of the respiration over that of the pulse (2½ to 1 instead of the normal 4 to 1) in an acute disease with a high temperature is almost pathognomonic of pneumonia. The motion of the alæ nasi, while it points toward trouble in the respiratory tract, does not necessarily mean that that trouble is pneumonia. Motion of the alæ nasi is, moreover, not uncommon when there are inflammatory processes in the abdomen. It is, therefore, not of much diagnostic importance in this instance. The flushing of the cheeks is merely a sign of fever and is not especially suggestive of pneumonia, as is often supposed. The diminution of the knee-jerk is of but little importance, but nevertheless is another point in favor of pneumonia. The high leucocyte count is characteristic of pneumonia, but is not inconsistent with an inflammatory process in the abdomen and hence is of practically no importance in the differential diagnosis. The points in favor of pneumonia are so much more numerous and fit together so much better than do those in favor of an inflammatory process in the abdomen that a positive diagnosis of PNEUMONIA is justified. The abdominal symptoms are presumably in part due to the constipation and in part secondary to the pneumonia. The blow was purely a coincidence.

Prognosis. The prognosis of pneumonia in children is, on the whole, very good. He is a strong boy and at present is not any sicker than he would be expected to be. His chances ought to be at least as good as the average. He can be confidently expected to recover. A certain number of children with pneumonia are unfortunate enough to develop empyema. He may or may not be one of these. It is impossible to tell.

Treatment. The most important part of the treatment is to give him a large supply of fresh air. All the windows in his room should be wide open. He can be protected from the wind, if necessary, by a screen. This being January, he must be warmly covered and will probably need a cap and heaters, perhaps mittens. If he is treated in this way his fever will, in all probability, not require any treatment. Applications to the chest, whether poultices, cotton jackets or mud, can

have no effect on the pneumonic process, tend to overheat the patient and, if heavy, interfere with the respiration by their weight. There are no drugs which have any effect on the pneumonic process. His heart is strong. Medicinal treatment is, therefore, contra-indicated.

The vaccine treatment of pneumonia is, in the author's opinion, irrational and, consequently, unjustifiable. Cough is not likely to be troublesome if he gets plenty of fresh air. If it is, and there is no edema of the lungs or bronchitis, heroin, in doses of from one twenty-fourth to one twelfth of a grain, will probably make him more comfortable and not do any harm. He should be fed once in three hours with milk and soft solids, such as simple cereals, custard, blanc mange, ice cream and milk toast. Care should be exercised in giving him milk because of the constipation.

The constipation will probably be relieved by low enemata of suds. If they are not sufficient, high enemata of suds, oil or glycerin may be tried. If these are unsuccessful, a tablespoonful of castor oil or two teaspoonfuls of syrup of senna will probably be effectual.

CASE 114. Matthew L., twenty-six months old, had always been unusually strong and vigorous, but very nervous and excitable. He had had a little "cold in the head" for two or three days, but had not seemed at all sick. The appetite was rather poor, February 19, and consequently he was not given as much to eat as usual. His bowels moved normally just before he went to bed. He was very restless and feverish all night and toward morning vomited several large curds of milk. He had a severe convulsion about 8.30 A.M. on the 20th. The colon was washed out and a considerable amount of well-digested, yellow feces obtained. He was given two tablespoonfuls of castor oil, which resulted in three large, loose, yellow movements which contained a little undigested food. He had no more convulsions, but twitched a little from time to time. He coughed occasionally, and moving, coughing and crying seemed to hurt him. The rectal temperature had ranged between 104° F., and 104.5° F. He was seen in consultation at 9 A.M., February 21.

Physical Examination. He was well developed and nourished. Pallor was marked and there was a slight tinge of cyanosis about the lips. He was perfectly conscious, but restless and irritable. There was a slight tendency to rigidity and he twitched occasionally. There was no stiffness or tenderness in the neck. The pupils were equal and reacted to light. The alæ nasi moved with respiration. The ear drums were normal. The tongue was moderately coated. The throat was normal. The heart and lungs were normal. The liver and spleen were not palpable. The extremities were normal. There was no definite spasm of the extremities and no paralysis. The knee-jerks were equal and slightly diminished. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes, and no eruption. The rectal temperature was 104.6° F., the pulse 140, the respiration 70. The leucocytes numbered 24,000.

Diagnosis. The persistence of the high temperature in spite of the thorough emptying of the bowels, the practically normal character of the movements and the cessation of the vomiting rule out all affections of the gastro-intestinal tract. The absence of sore throat and eruptions rules out tonsillitis

and scarlet fever, while the absence of catarrhal symptoms and the leucocytosis exclude influenza. The initial convulsion and the persistence of twitching, together with the slight tendency to rigidity, suggest, to a certain extent, some form of meningitis, more probably the cerebrospinal. The normal mental condition and the absence of all physical signs of meningeal irritation, unless the twitching and tendency to rigidity be such, practically exclude meningitis. An initial convulsion, moreover, is not uncommon at the onset of any acute disease in childhood, and a high temperature often causes twitching and a tendency to rigidity in nervous children. These points do not count much, therefore, in favor of meningitis. The continued high temperature, the slight cough, the pain on motion, cough and crying, and, more than all, the much greater increase in the rate of the respiration than in that of the pulse (2 to 1 instead of the normal 4 to 1), make the diagnosis of PNEUMONIA practically certain in spite of the absence of physical signs in the lungs. The movement of the alæ nasi, the slight tinge of cyanosis about the lips and the diminution of the knee-jerks, although not of much importance, are corroborative of this diagnosis, while the leucocytosis is consistent with it.

Prognosis. The prognosis of pneumonia in childhood is very good. In infancy, however, it is a far more serious disease. This boy has always been strong and well, is in good general condition and probably will not have much lung involved. The symptoms of nervous irritability do not make the outlook any less favorable. The chances are, therefore, very much in favor of his recovery.

Treatment. See Case 113. The windows must be kept wide open, day and night. The cool, fresh air will probably lower the temperature somewhat, and thus diminish the nervous symptoms. If they persist, the temperature must be reduced by bathing. The coal-tar products should never be used in pneumonia, either to reduce the temperature or to relieve nervous symptoms. The temperature needs to be reduced, not because it is 104.6° F., but because in this instance this degree of temperature causes nervous symptoms. If it did not, it would not be necessary to treat it. Sponge

baths of alcohol and water, equal parts, at 90° F., will probably be sufficient to control it. If they do not, fan baths will almost certainly be effectual. Fan baths are given in this way: The patient is stripped and wrapped in cheesecloth. This is then wet with water at 100° F. and the patient fanned. The temperature is reduced by the evaporation of the water. The cheesecloth is wet from time to time as the water evaporates. Children seldom object to this form of bath. If this is ineffectual, he may be given a cold pack at from 60° F. to 70° F. Children seldom bear tub baths well, and it is, as a rule, wiser not to use them. If necessary, he may be given sodium or potassium bromide, in doses of from three to five grains, from time to time. There is no indication for stimulation at present.

CASE 115. David K., eight years old, had had the measles when a baby. Since then he had always been well. August 20 he began to complain of a little pain in his lower left chest, which was worse when he ran or played. August 22 he began to have a little cough, which was dry and not accompanied by pain. After the beginning of the cough the pain in the chest ceased, his appetite became poor and he acted weak and tired. His mother said that he wanted to sit alone by himself instead of playing with the other children. She thought that he had been feverish and said that he had sweat profusely at night. He was first seen August 30.

Physical Examination. He was well developed and nourished, but somewhat pale. There was no dyspnea, except on exertion. The tongue was moist with a moderate white coat in the center. The throat was normal. The cardiac impulse was visible in the fourth space in the left parasternal line. The right border of the relative cardiac dullness was about two thirds of the distance from the right border of the sternum to the right nipple. The upper border of the relative cardiac dullness was at the lower border of the second rib. The heart sounds were normal in character, but louder to the right of the sternum than to the left. The second pulmonic sound was considerably louder than the second aortic. The left chest moved somewhat less in respiration than the right. The intercostal spaces were the same on both sides. There was dullness in the left back from the spine to the angle of the scapula, below which there was flatness. The whole left axilla was flat. There was dullness in the left front from the upper border of the third rib to the upper border of the fourth rib, below which there was flatness. There was dullness in Traube's space. The respiration was loud and bronchial below the upper level of dullness, both in back and in front. The voice sounds were increased; the vocal fremitus diminished. No râles were heard. Above the level of dullness the respiration and voice sounds were normal in character and a few fine moist râles were heard. There was a marked sense of resistance over the dull and flat areas. There was exaggerated vesicular resonance over the whole right chest. The respiration was loud and distinctly puerile. The voice sounds and

fremitus were normal. No extraneous sounds were heard. The upper border of the liver flatness in the nipple line was at the upper border of the seventh rib. The lower border of the liver was palpable 2 cm. below the costal border. The spleen was not palpable. The dullness was not determined because of the dullness in the left chest. The abdomen showed nothing abnormal. The extremities were normal. There was no spasm or paralysis and the knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 101.2° F., the pulse 130 and the respiration 48.

Diagnosis. The trouble is, of course, located in the left chest. The only question is whether there is solidification of the lung or an effusion into the pleural cavity. If the trouble is in the lung, it is, judging from the history, more probably tubercular than pneumonic. The diminution in the motion of the left chest and the mere presence of dullness or flatness are of no importance in differential diagnosis. The points in favor of solidification of the lung are the normal level of the intercostal spaces, the loud bronchial respiration and the increased voice sounds. The intercostal spaces are, however, often level in childhood, even when there is considerable fluid in the pleura, because the elastic chest gives as a whole, while in the adult the rigid chest wall does not give and the intercostal spaces yield. Theoretically, the respiration and voice sounds ought not to be transmitted through fluid; practically, they often are in childhood. The explanation is presumably to be found in the elasticity of the thoracic wall at this age. The bronchial character of the respiration in pleural effusion is due to the compression of the lung. The points in favor of consolidation of the lung are, therefore, not as important as they at first appear.

The points in favor of a pleural effusion are the distribution of the dullness and flatness, which follows gravity rather than the lobes of the lung, the displacement of the heart to the right, the dullness in Traube's space (which means depression of the diaphragm), the diminished fremitus, the absence of râles and the marked sense of resistance. The distribution of the dullness and flatness is not of quite as much importance

in this instance as it usually is, because the trouble, being tubercular, would not be as likely to be lobar in its distribution as would a pneumonia. It may be argued that, if the diaphragm is depressed, the spleen ought to be palpable. The location of the spleen is such, however, that depression of the diaphragm does not displace it. The displacement of the heart and diaphragm is positive proof of the presence of a pleural effusion. The marked sense of resistance is almost positive proof of effusion, as this is practically never felt to the same extent over a solid lung. The diminished fremitus and the absence of râles are of much less importance, as they can be explained in other ways.

The accentuation of the second pulmonic sound is, of course, due to the increased pressure in the pulmonary circulation. The physical signs in the right chest are characteristic of compensatory emphysema. The upper border of the liver flatness is as much below the normal level as the lower border is below the costal margin, showing that the liver is not enlarged, but merely displaced downward.

The next point to be decided is whether the effusion is serous or purulent. The effusion in this instance is, judging from the history, primary, that is, it is not secondary to some other acute disease. Primary pleurisy at this age is almost always serous; secondary, almost always purulent. The sweating is merely a sign of weakness and does not count at all in favor of a purulent effusion. The temperature is consistent with either condition. There is nothing about the physical signs which is of any value in differential diagnosis. A leucocyte count would probably be of considerable assistance in diagnosis because there is almost never a leucocytosis with a primary serous effusion, and almost always a marked leucocytosis when the fluid is purulent. The absence of leucocytosis in primary serous effusions is presumably due to the fact that they are almost invariably tubercular. The only positive method of diagnosis is exploratory puncture. It is reasonably safe to make a diagnosis of SEROUS PLEURISY in this instance, however, on the history.

A skin tuberculin test will aid much in determining whether or not the effusion is or is not tubercular. A more certain

method, however, is by the examination of the fluid obtained by exploration or aspiration. There are, as a rule, a large excess of lymphocytes in the tubercular cases, and of polynuclear cells in the acute infectious variety. If the fluid is digested before the examination (inoscopy), tubercle bacilli can be found in a large proportion of the tubercular cases; in fact, more positive results are obtained in this way than by animal inoculations.

An exploratory puncture was done and a serous fluid, which contained an excess of lymphocytes and a few tubercle bacilli, was obtained.

Prognosis. There is no danger to life from the effusion if it is not allowed to accumulate enough to cause symptoms of pressure. It is not an especially serious form of tuberculosis. The prognosis is, therefore, that of tuberculosis in general.

Treatment. The effusion is not causing any symptoms from pressure on other organs. It is, therefore, wiser not to withdraw it at present. Applications to the chest wall are useless. It is unreasonable to expect that diuretics and cathartics will draw the fluid from the pleural cavity, in which the pleura is inflamed and not in a condition to absorb fluid, rather than from the tissues. They cannot be of use, anyway, unless liquids are excluded from the diet. It is very unwise to cut liquids out of a child's diet, and, moreover, free catharsis is very weakening. They cannot, therefore, do much, if any, good, and are almost certain to do harm by interfering with the ingestion of food and weakening the patient. They ought not to be used in this instance. If the fluid increases enough to cause symptoms of pressure, or if it does not begin to diminish after ten days or two weeks, it should be withdrawn. If the chest refills, the aspiration may have to be repeated several times.

He must be kept quiet in bed and well fed. The further treatment is that of tuberculosis in general.

CASE 116. Sophy L. was seen in consultation when four and one-half years old. She had always been delicate. Seven and one-half weeks previously she was taken suddenly ill with a pneumonia involving the whole left lower lobe. She was under the care of Dr. G. for a week. The crisis did not occur during this time. Dr. G. was then discharged and another doctor called in. The crisis is said to have occurred on the eighth or ninth day. A week later Dr. G. was again given charge of the case. He found the temperature running between 103° F. and 104° F. It dropped a little after a few days and since then had ranged between 101° F. and 102° F. She had had no chills, but had sweat freely, especially about the head. She was not short of breath and did not complain of pain. She coughed occasionally. Her appetite was good, but she was somewhat constipated. She had lost weight steadily. She had been up and about the house for ten days. An examination of the sputum for tubercle bacilli had been negative.

Physical Examination. She was slight, thin and somewhat pale. There was no cyanosis. She cried loudly without distress. The cardiac impulse was palpable just to the left of the sternum. The impulse was also palpable to the right of the sternum and was stronger there than on the left. The cardiac dullness extended from 2 cm. inside the right nipple to 1 cm. to the left of the left border of the sternum. The heart sounds were louder to the right than to the left of the sternum. The sounds were not abnormal. The left side of the thorax appeared larger than the right, and moved much less than the right in respiration. The left intercostal spaces were nearly obliterated. There was flatness in the left chest above the third rib in front, the fifth in the axilla and the mid-scapula behind. In this area respiration was bronchial, and the voice sounds and fremitus slightly increased. Below the flat area down to the fifth space in front, the sixth space in the axilla and in the whole back there was flat tympany. Below this there was loud tympany. In these areas respiration was diminished, but almost vesicular in character. The voice sounds were diminished, but not changed in character. The vocal fremitus was absent. There was tympany in

Traube's space. There was a very marked sense of resistance over the whole left chest, more marked in the lower portion than in the upper. The right chest was somewhat hyperresonant, except that there was a triangular area of dullness in the back, the apex being at the level of the spine of the scapula, the side along the back bone and the base along the tenth rib, extending outward about two inches. The respiration was of normal character, but louder than normal over the whole right side. The upper border of the liver flatness was at the upper border of the sixth rib; the lower border was palpable 4 cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen was rather full, but not tense or tender. The extremities showed nothing abnormal. There was no general enlargement of the superficial lymph nodes. The rectal temperature was 100° F., the pulse 120, the respiration 35.

Diagnosis. The history is so characteristic of an empyema secondary to pneumonia that it hardly seems necessary to consider anything else, unless the physical examination proves this supposition to be wrong. Other remote possibilities are an unresolved pneumonia, an acute tubercular pneumonia which has changed to a chronic condition, and a secondary tubercular infection consecutive to a pneumococcus pneumonia.

The physical signs are, however, confusing. The marked displacement of the heart to the right, the enlargement of the left chest, the obliteration of the left intercostal spaces, and the triangular area of dullness in the right back (Grocco's sign) prove that there is something in the left pleural cavity. The tympany in the lower portion suggests that this may be air. The marked sense of resistance proves that it is fluid. It would be almost unheard of, moreover, to have fluid or solid lung in the upper part of the chest and air alone in the lower. The tympanitic sound is undoubtedly transmitted from the abdomen, and the vesicular respiration and normal voice sounds from the right side. The bronchial respiration and increased voice sounds and fremitus in the upper portion suggest strongly that the upper half of the chest is filled by solid lung. The marked sense of resistance and the marked

displacement of the heart, together with the well-known fact that in children the respiration and voice sounds, and sometimes even the fremitus, may be transmitted through fluid if the tension is high enough, show conclusively that the upper as well as the lower portion of the chest is filled with fluid. The bronchial character of the respiration is due to the compression of the lung, which is presumably squeezed into a small mass at the root. The tympany in Traube's space is probably also transmitted from the abdomen and does not mean that the diaphragm is in its normal position.

The signs in the right chest are characteristic of a compensatory emphysema. The upper border of the liver flatness is slightly lower than normal, but not as much so as the lower border. This shows that the liver is enlarged. The enlargement is probably due to fatty change, resulting from malnutrition and toxic absorption, although it may possibly be amyloid.

There is undoubtedly fluid in the left pleural cavity. This fluid accumulated after pneumonia, and the patient is a child. The chances are, therefore, at least nineteen out of twenty that it is purulent rather than serous. The absence of chills does not count against, nor the presence of sweating for, a purulent effusion, because chills are rather unusual with an empyema at this age, and sweating is common in all conditions of weakness. The diagnosis of PURULENT PLEURISY is, therefore, justified without an exploratory puncture.

Prognosis. If the chest is not opened she will almost certainly fail steadily and finally die. There is, however, a small chance that the pus may eventually find a way out for itself or become encapsulated and absorbed. In either case, she is certain to be left with a very greatly deformed chest. If the chest is opened at once she will almost certainly recover, because her general condition is surprisingly good under the circumstances and the evidences of septic absorption comparatively slight. It is six weeks since the appearance of the effusion, it is very large, the lung is much compressed and probably more or less bound down by adhesions. The chances are, therefore, that it will not fully expand and that she will be left with some deformity.

Treatment. The only rational treatment in this instance is the opening and draining of the pleural cavity. It is true that in rare instances recovery ensues in pneumococcus empyema after tapping. This happens so seldom, however, that it cannot be regarded as a justifiable procedure. The almost invariable result is that the pus reaccumulates and that the chest has to be finally opened. In the meantime the general condition has been further impaired as the result of the continued septic absorption, and the lung has been further compressed and its complete expansion rendered more difficult. The long duration and the large amount of the effusion in this instance make the chances of cure from aspiration even less than the average. She should, therefore, be operated on at once. The author believes that resection of a rib gives much better results than simple incision. A resection should certainly be done in this instance because, on account of the duration of the process, there are probably large clots and masses of caseous material which could not be satisfactorily cleaned out through an incision.

CASE 117. Joseph C. was the only child of healthy parents. There was no tuberculosis in either family and there had been no known exposure to it. He was born a month before he was expected. He was fed from the first on simple dilutions of milk with water. His digestion was good, but he was always anemic. He had pneumonia about the middle of December, but was considered well early in January. His temperature rose again January 22 and the respiration became rapid and difficult. His physician found dullness with bronchial respiration and voice sounds over the whole left chest. Although the heart was in normal position, he suspected the presence of fluid and tapped him twice in the lower back and once in the lower axilla, but obtained nothing. From this time on he ran an irregular temperature, which varied between normal and 105° F. The respiration continued rapid and he had a troublesome cough. He took his food fairly well and had no disturbance of the digestion but, nevertheless, lost weight steadily. He was seen in consultation March 8, when thirteen and one-half months old.

Physical Examination. He was long, thin, feeble and very pale. The anterior fontanelle was one cm. in diameter. The bones of the skull overlapped a little. He had eleven teeth. The ears and throat were normal. There was a moderate rosary. The cardiac impulse was felt distinctly in the second, third and fourth interspaces. The left and upper borders of dullness could not be determined because of the dullness in the left chest. The right border was two cm. to the right of the median line. The action was regular and the sounds strong. There was a systolic murmur at the base of the heart and a venous hum in the neck. The second sound at the pulmonic area was slightly accentuated. The left side of the chest moved less than the right. There was no bulging of the intercostal spaces. There was flatness with a very marked sense of resistance in the left front and axilla above the fifth rib and in the back above the spine of the scapula. The respiration and voice sounds were loud and bronchial in the flat area while the tactile fremitus was diminished. There was slight tympany over the rest of the

left side, the respiration and voice sounds being diminished and bronchial in character. There was tympany in Traube's space. Grocco's sign was absent. The right chest was hyperresonant and the respiration exaggerated, but vesicular. The abdomen was large, lax and tympanitic. The lower border of the liver was palpable one cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. The genitals were normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99.4° F.; the pulse, 120; the respiration, 35.

The leucocyte count was 24,000.

Diagnosis. The trouble in this instance is unquestionably located in the upper portion of the left chest. The only conditions which need to be considered are solidification of the lung, presumably due to an unresolved pneumonia, and an accumulation of fluid, almost certainly pus. The abnormalities in the physical signs in the lower portion of the chest are of no importance in differentiating between them, the tympany being transmitted from the abdomen, the diminished respiration being due to the diminution in the expansion on that side, while the bronchial respiration may be transmitted from either a solid or a compressed lung. Grocco's sign would, of course, be absent with an accumulation of fluid in the upper chest. The systolic murmur at the base of the heart and the venous hum in the neck are both signs of the evident anemia. The accentuation of the second pulmonic sound is due to the increased pressure in the pulmonary circulation. The flatness is consistent with either condition. Loud bronchial respiration and voice sounds are heard so commonly over accumulations of fluid in infancy that they do not count much in favor of solidification of the lung. The absence of bulging of the intercostal spaces is somewhat against an accumulation of fluid, but is not of much importance, because bulging of the intercostal spaces is unusual in infancy, the chest yielding as a whole first. The location of the flat area, which corresponds fairly closely to the upper lobe, and the normal position of the heart are

strong evidence in favor of solidification of the lung. The long duration of the illness, the marked irregularity of the temperature, the diminution of the tactile fremitus, the leucocytosis and, more than all else, the very marked sense of resistance, count, on the other hand, in favor of an accumulation of pus. If there is an empyema it is, of course, encapsulated in the upper portion of the chest, the lung below being bound to the parietal pleura. The pressure of the fluid would be exerted chiefly on the upper lobe which would be much compressed before the lower portion would be affected. The location of the flat area would, therefore, naturally correspond fairly closely to that of the upper lobe. The absence of displacement of the heart does not count as much against an empyema as at first appears, because with an encapsulated empyema at the apex it would almost certainly be caught in the adhesions below and held in position. The evidence seems, therefore, much in favor of an encapsulated empyema at the apex, certainly enough so to demand an exploratory puncture.

A needle was introduced high in the axilla, just behind the anterior axillary line, and pus withdrawn, thus justifying the diagnosis of ENCAPSULATED EMPYEMA.

Prognosis. The baby has always been anemic and is in very poor general condition. The chances are, therefore, very much against his recovery, even if he is operated upon immediately. The facts that the heart is not displaced and that the fluid is retained in the upper portion of the chest show that the lung must be bound down by very firm adhesions. The chances are, therefore, that the lung will not fully expand and that, if he recovers, he will be left with some deformity of the chest.

Treatment. The treatment is the immediate resection of a rib as low down as is consistent with reaching the cavity. Drainage will be better in this way than if a rib is removed higher up. (See Case 116.)

CASE 118. Jeremiah M. was five years old. His parents and two other children were living and well. There had been no deaths or miscarriages. There was no tuberculosis in the family and there had been no known exposure to it. He had been perfectly well until he had the measles, five weeks before his admission to the Children's Hospital. This was followed in two weeks by pneumonia. There had been no drop in the temperature since then. The cough had continued, but the pain in the side, which was very troublesome at first, had ceased. He was able to take but little nourishment, had frequent attacks of dyspnea and slept very poorly.

Physical Examination. He had lost much weight and color. He was clear mentally, but apathetic. He was able to lie down. The alæ nasi moved with respiration. The membranæ tympanorum were normal. The throat was normal, the tongue but little coated. The left chest moved much less than the right. The cardiac impulse was indistinctly palpable in the fourth space, just outside the left nipple line. The right border of the cardiac dullness was three cm. to the right of the median line; the upper and left borders could not be determined because of the dullness in the left chest. The action was regular. The heart sounds were louder to the left than to the right of the sternum and were of fair strength. The second sound at the pulmonic area was slightly accentuated. There were no murmurs. The right chest was slightly hyperresonant and the respiratory sound was louder than normal. There was flatness with a marked feeling of resistance in the left axilla above the sixth rib, below which there was tympany continuous with that in Traube's space. There was moderate dullness over the middle third of the left scapula. The rest of the left chest was slightly dull. The respiration was much diminished in the flat area and bronchial in character. It was somewhat diminished over the rest of the left chest, but nearly normal in character. The voice sounds were diminished and bronchial in the flat area; of normal intensity, but slightly bronchial, elsewhere. The tactile fremitus could not be determined, because he would neither speak loudly nor cry. There were a few fine, high-pitched moist râles in the left front and

an occasional medium moist râle throughout the back. The abdomen was sunken and tympanitic. The upper border of the liver flatness in the nipple line was at the upper border of the sixth rib; the lower border was not palpable. The spleen was not palpable. The extremities were normal and there was no spasm, paralysis or disturbance of the deep reflexes. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 102° F.; the pulse, 132; the respiration, 40.

The urine was cloudy, acid in reaction, of a specific gravity of 1028, and contained no albumin or sugar. The sediment consisted of amorphous urates.

The leucocyte count was 23,400.

Diagnosis. Reasonable explanations for the persistence of the fever and other symptoms are an extension of the pneumonia, the development of a purulent pleurisy, some incidental complication, or that the trouble was not pneumonia, as supposed, but tuberculosis. The absence of any physical signs of disease outside of the lungs and the normal condition of the ears and urine rule out all incidental complications. His good condition before the onset of the illness, the absence of any signs of tuberculosis elsewhere, the rarity of acute tubercular pneumonia at this age and the fact that the signs in the lungs are more consistent with another condition rule out tuberculosis. The diagnosis lies, then, between solidification of the lung, due to an extension of the pneumonic process, and a purulent pleurisy. Fever, rapid pulse and respiration, motion of the alæ nasi, cough, diminished mobility on the left side and leucocytosis are common to both diseases and hence of no aid in distinguishing between them. The flatness in the axilla is consistent with either condition, as is the bronchial character of the respiration. The marked diminution in the intensity of the respiratory and voice sounds is more characteristic of an accumulation of fluid, but can occur in solidification of the lung if a bronchus is obstructed. The bronchial character of the respiration and voice sounds may be due to pneumonic solidification of the lung or to compression of the lung by fluid. These signs are, therefore, of but little assistance. The marked sense of

resistance, however, counts strongly in favor of an accumulation of fluid, more strongly than any other point counts in favor of pneumonia, so strongly, in fact, as to justify a probable diagnosis of this condition. The normal position of the heart and the tympany in Traube's space prove that there cannot be any large accumulation of fluid in the pleural cavity. Small quantities of fluid are usually situated, moreover, in the lower back rather than in the axilla. If there is fluid present, it must, therefore, be encapsulated. The sense of resistance and the diminution in the respiration are more marked than would be expected from an encapsulated empyema of no greater size than that indicated by the area of flatness in the axilla. The location of this area is that in which the signs of interlobar empyema are usually most marked. An accumulation of fluid between the lobes, reaching the surface in the axilla, will account for the marked sense of resistance and the diminution in the respiration. The greater dullness under the middle third of the scapula is corroborative evidence in favor of this supposition. A diagnosis of INTERLOBAR EMPYEMA is, therefore, a reasonable one. The slight dullness over the rest of the left chest is probably due to thickening of the pleura; the diminished respiration, to thickening of the pleura and the defective expansion on that side; the slightly bronchial character of the respiration, to partial compression of a portion of the lung; the râles, to defective expansion and slight congestion. The tympany in the lower axilla is undoubtedly transmitted from the abdomen.

Whenever the physical signs point as strongly to a purulent pleurisy as they do in this instance, an exploratory puncture should be done at once. A needle was, therefore, introduced into the fifth left space in the mid-axillary line and pus obtained, thus confirming the diagnosis.

Prognosis. If the chest is not opened he will almost certainly fail steadily and finally die. There is a small chance that the pus may break through into a bronchus or be absorbed. In either case he will be left with a badly damaged lung and probably with a deformed chest. If the chest is opened at once he will almost certainly get well, because his

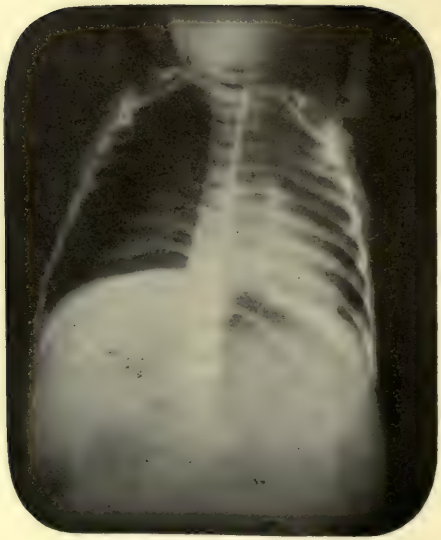
general condition is fair and the evidences of septic absorption comparatively slight. There being but little compression of the lung, and the pus being between the lobes where, if adhesions form, they will do no harm, he can be expected to recover with a practically normal chest.

Treatment. The only rational treatment in this instance is the opening and draining of the pleural cavity. It is true that in rare instances recovery ensues in pneumococcus empyema after tapping. This happens so seldom, however, that it cannot be regarded as a justifiable procedure. The almost invariable result is that the pus reaccumulates and that the chest has to be finally opened. In the meantime, the general condition has been further impaired as the result of the continued septic absorption, and the lung has been further compressed and its complete expansion rendered more difficult. He ought, therefore, to be operated on at once. Resection of a rib allows much freer drainage than does simple incision and is, therefore, the preferable procedure.

CASE 119. Charles C., three years old, entered the Children's Hospital, February 5, because of a hemorrhage from his stomach. He was well developed and nourished, but very pale. There was a venous hum in the neck and a systolic murmur at the pulmonic area. The left border of the cardiac dullness was six cm. to the left and the right border two and one-half cm. to the right of the median line, while the upper border was at the middle of the third rib. The lungs were normal. The upper border of the liver flatness was in the fifth space in the nipple line; the lower border was palpable three cm. below the costal border in the same line. The spleen was palpable four cm. below the costal border. The abdomen was normal and there was no edema.

Examination, February 10, showed a little puffiness of the eyelids. There was dullness on the right side below the angle of the scapula behind and the sixth rib in the axilla, extending forward as far as the anterior axillary line. The respiratory and voice sounds were diminished in this area, but not changed in character. The tactile fremitus was slightly diminished and the sense of resistance increased. The left border of the cardiac dullness was as before, and the lower border of the liver was in the same position. There was shifting dullness and a slight fluid wave in the abdomen. The diagnosis of effusion in the right pleural cavity was made, a needle introduced in the eighth space in the posterior axillary line and about two ounces of bloody serum withdrawn. He began to breathe badly during the afternoon and slept but little that night, although supported by pillows. The physical examination, February 11, was as follows:

Physical Examination. His breathing was difficult and labored and he was unable to lie down. There was, however, no cyanosis. The right side of the chest moved but little in respiration, but it did not appear larger than the left and there was no bulging of the intercostal spaces. There was tympany over the whole right front and over the back below the angle of the scapula and outside of the inner border of the scapula, where there was dullness. The respiration was somewhat diminished over the whole side, amphoric in character in the tympanitic area, bronchovesicular in the dull



CHARLES C. Case 119.

area. The voice sounds were everywhere diminished, but bronchial in character. The tactile fremitus was absent. The sense of resistance was diminished. The coin sound was present, but there was no succussion sound. The right border of the cardiac dullness was at the left border of the sternum; the left border, eight cm. to the left of the median line. The upper border of the liver flatness, in the nipple line, was just above the costal border. The liver was palpable three cm. below the costal border in the nipple line. The rectal temperature was 102.8° F.; the pulse, 160; the respiration, 60.

Diagnosis. There can be no doubt as to the diagnosis of PNEUMOTHORAX with collapse of the lung. The tympanitic percussion note, the amphoric respiration, the diminution in the voice sounds, the absence of fremitus, the diminished sense of resistance and the coin sound are all characteristic of this condition. The facts that the right side moves in respiration, that there is no enlargement of that side and no bulging of the intercostal spaces, that the respiratory sound is not much diminished and that there is not much displacement of the heart and liver show that the opening from the lung into the pleural cavity is still patent, that is, that it is an open pneumothorax. The absence of the succussion sound shows that there is little, if any, fluid in the pleural cavity. It is probable that the lung was pricked with the needle during the aspiration the day before and that the pneumothorax is the result. The diagnosis of pneumothorax is confirmed by the accompanying Roentgenograph.

Prognosis. The pneumothorax being due to a mechanical injury to the lung and not to disease, the prognosis is good. The opening will almost certainly close in the course of one or two days and the air be absorbed inside of two weeks.

Treatment. There is no treatment for the pneumothorax. It is useless to withdraw the air while the opening into the lung is still patent; it will be unnecessary after it is closed. Treatment, as far as it is directed to the pneumothorax, must, therefore, be symptomatic and for comfort. That of the original disease may have to be modified, but need not be interrupted.

CASE 120. Frank H. was an only child. His mother was alive and well, his father had been dead some years. The cause of his death was not known. There was no tuberculosis in either family and there had been no known exposure to it. He was born at full term, after a normal labor, was nursed by his mother and was perfectly well until he was seven and one-half years old, when a tumor was discovered in the scrotum. The right testicle, with a tumorous mass, was removed a few months later at the Boston City Hospital by Dr. F. B. Lund. Dr. F. B. Mallory reported that the mass was a malignant mixed tumor. He remained well for two years, when he had pneumonia of the left lower lobe, which cleared up entirely. This was followed, a few months later, by whooping-cough. His appetite had been poor and he had failed steadily in weight and strength since the pneumonia. A week before he entered the Children's Hospital, when ten years old, he began to have pain in the left chest, which was increased by a deep breath. The pain was followed, in a few days, by shortness of breath. He had but little cough, however, and raised nothing. He had had no hemoptysis, night sweats, dysphagia, abdominal pain or swelling of the ankles, and had been up and about the house.

Physical Examination. He was well developed, but poorly nourished and moderately pale. His tongue was somewhat coated, his throat normal. The cardiac impulse was palpable in the fifth left space, seven cm. to the left of the median line. The upper and left borders of the cardiac dullness could not be determined because of the flatness in the left chest; the right border was three cm. to the right of the median line. The action was regular and the sounds normal. The left side did not move with respiration and the intercostal spaces were somewhat less distinct than on the right. The circumference of the two sides at the level of the nipples was, however, the same. There was flatness over the whole left side of the chest and in Traube's space. The sense of resistance was much increased. The respiratory and voice sounds were diminished and bronchial in character. The tactile fremitus was absent. No râles were heard. The right side was hyperresonant and the respiratory sound was exag-

gerated. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line and of the sixth rib in the mid-axillary line. The lower border was palpable three and one-half cm. above the anterior superior spine, seven cm. below the costal border in the nipple line and twelve and one-half cm. below the tip of the ensiform. It ran under the left costal border just inside the left anterior axillary line. The surface was smooth, except in the epigastrium, where there was a protrusion about three cm. in height and seven cm. by three cm. in diameter. The spleen was not palpable. There were no signs of fluid in the abdomen and no other masses were felt. The superficial veins of the abdomen and of the left side of the chest were dilated. The left testicle was normal. There was a scar on the right side of the scrotum, which was empty. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 100° F.; the pulse, 120; the respiration, 40.

The urine was clear, acid in reaction, of a specific gravity of 1032 and contained no albumin or sugar.

Diagnosis. When it is taken into consideration that the enlargement of the liver followed the removal of a malignant tumor of the testicle, that it is nodular and not accompanied by jaundice, ascites or enlargement of the spleen, there can be no question as to the diagnosis of SARCOMA OF THE LIVER. The condition in the left chest is more obscure. The immobility of the left side, the partial flattening of the intercostal spaces, the flatness over the whole side and in Traube's space, the diminished respiration and voice sounds, the absence of fremitus and the increased sense of resistance seem, at first thought, to prove conclusively that there is a large accumulation of fluid in the left pleural cavity. The heart is, however, not displaced more than one-half of a cm., but this may be, of course, because it is bound down by adhesions. Judging from the position of the lower border of the liver, the dullness in Traube's space may be equally well due to the enlarged liver. Grocco's sign is absent.

These are strong points against a pleural effusion. Is it possible to explain the other signs in any other way? It certainly is. A massive tumor involving the whole lung will give flatness and a marked sense of resistance over the whole side. If the bronchi are partially obliterated, the respiratory and voice sounds will be diminished and bronchial in character and the fremitus absent. The heart will not be displaced and Grocco's sign will be absent, as in this instance. The enlargement of the superficial veins of the left side of the chest also points strongly to a new growth in the lung. The diagnosis of a massive SARCOMA OF THE LUNG is, therefore, certain.

Prognosis. The prognosis is absolutely hopeless. He will probably not live more than a few weeks, certainly not more than a few months.

Treatment. Nothing can be done, except to make him as comfortable as possible.

SECTION VIII.

DISEASES OF THE HEART AND PERICARDIUM.

CASE 121. Dillaway F., the second child of healthy parents, was delivered by version at full term, was apparently normal at birth and weighed seven and one-half pounds. He was very badly fed during his first year and suffered from indigestion during his second year. A murmur was discovered in his heart during a routine examination when he was ten months old. When he was two years old he had influenza, followed by pneumonia. Since then he had been well, except for symptoms of adenoids and occasional nosebleeds, which were probably due to them, until the last few months, during which he had had a recurrence of his indigestion. He was seen when four years old. He had never been short of breath or cyanotic.

Physical Examination. He was fairly developed and nourished and looked well. His color was good, but when he cried there was, perhaps, a slight tinge of cyanosis in the cheeks. His throat was normal, his tongue moderately coated. There was no deformity of the chest. The cardiac impulse was visible and palpable in the fifth space in the nipple line, $6\frac{1}{2}$ cm. to the left of the median line (normal is in fourth space, 6 cm. to left of median line). The left border of the relative cardiac dullness corresponded to the impulse. The upper border of the relative dullness was at the upper border of the second rib (normal is in the second space), and the right border 3 cm. to the right of the median line (normal is $2\frac{1}{2}$ cm.). There was no dullness under the manubrium. The action was regular; the rate, 90 (normal). A very distinct thrill was felt in the second left interspace. It was also palpable, but much less distinctly, over the rest of the precordia. The first sound was everywhere distinct, but was followed over the whole precordia by a loud, rough murmur, loudest in the second left interspace. This murmur was also audible in the

neck and over the whole chest, back and front. The second pulmonic sound was much louder than the second aortic, so much louder that it was undoubtedly accentuated. The lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no clubbing of the fingers or toes. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

Diagnosis. This boy undoubtedly has a cardiac lesion. The first thing to be decided is whether it is congenital or acquired; next, to determine, if possible, what the lesion is. The points in favor of a congenital lesion in this instance are the fact that the murmur was discovered when he was only ten months old, before he had had any disease likely to be accompanied by endocarditis; the slight enlargement of the heart in comparison with the intensity of the murmur; and the location of the greatest intensity of the murmur and of the thrill and their distribution, which do not correspond to those of any of the acquired lesions. The points against a congenital lesion are the absence of bulging of the precordia and of all the usual signs of interference with the oxygenation of the blood. There is, however, no reason for bulging of the precordia when the heart is no more enlarged than in this instance, and it is perfectly possible to have congenital lesions which from their nature, or from the presence of compensatory lesions, do not interfere with the oxygenation of the blood. A positive diagnosis of CONGENITAL HEART DISEASE is, therefore, justified.

It is impossible during life to make a certain diagnosis of the exact lesion in congenital heart disease, although a probable diagnosis is often possible. In this instance the location of the maximum intensity of the murmur and of the thrill in the second left interspace and the transmission of the murmur into the neck point strongly to a narrowing of the pulmonic orifice. The absence of all signs of deficient oxygenation of the blood shows that there must be some compensatory lesion. The accentuation of the second pulmonic sound suggests that this lesion is an open ductus arteriosus.

Prognosis. He has reached the age of four years and has

passed through a pneumonia without the appearance of any symptoms referable to the heart, has perfect compensation with but little cardiac enlargement, and has developed normally. It seems reasonable to suppose, therefore, that his cardiac lesion will not interfere with his growth and development and that he will reach adult life and perhaps attain old age. The prognosis in this instance is as good, if not better, than it would be if he had an acquired lesion.

Treatment. He requires no treatment at present, except that it will be advisable for him to avoid continued, excessive exertion. If failure of compensation develops, the treatment will be that of failure of compensation in general.

CASE 122. Francis H. was the third child of healthy parents. The other children were alive and well and there had been no miscarriages. He was born at full term, after a normal labor, and weighed nine pounds. He was somewhat cyanotic at birth and it was hard to establish respiration. The trained nurse who had charge of him at first did not notice that he was cyanotic. When his mother took charge of him, when he was a month old, she noticed, however, that he became a little blue on crying. She thought that the cyanosis on crying had not increased since then and that his color was good at other times. She had also noticed that he breathed quickly when he was asleep and that he had a tendency to keep his mouth open. He had a "funny little cough" in the beginning, which improved somewhat after the first week. She said that recently he had coughed "like an old man." He had been fed on modified cows' milk since he was a week old, but had had no disturbance of the digestion. He had had no illnesses. He was seen in consultation when three months old.

Physical Examination. He was fairly developed and nourished. When quiet, he was pale, except that the hands and feet were a little bluish. When he cried, he was everywhere deeply cyanotic. The anterior fontanelle was level. The pupils were equal and reacted to light. The mouth and throat were normal, and the tongue was clean. The chest was of good shape. The cardiac impulse was not visible, but was indistinctly palpable in the fourth space, six cm. to the left of the median line. There was no thrill. The left border of the cardiac dullness corresponded to the impulse. The upper border was under the second rib; the right border, two cm. to the right of the median line. The action was perfectly regular and the sounds were strong. The second pulmonic sound was normal. The first sound in the third and fourth left spaces was at times followed by a short, blowing murmur, which was not transmitted. No murmurs were heard elsewhere. The lungs were normal. The lower border of the liver was palpable three cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen was normal. There was no clubbing of the extremities.

There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. He weighed ten pounds.

Diagnosis. The cyanosis and the cardiac murmur being the only abnormal physical signs, it is evident that the trouble is located in the heart. The cyanosis proves that the condition is not functional, but organic. The facts that he is but three months old, that he has been cyanotic since he was a month old and probably since birth, that he has had no illnesses to cause endocarditis, that the heart is not enlarged, that the second pulmonic sound is not accentuated, although the murmur is in the mitral area, and that there is no enlargement of the liver and spleen or edema of the lungs or extremities, in spite of the cyanosis, are sufficient to show that the lesion in the heart is not acquired. It must, therefore, be congenital. The combination of cyanosis and a cardiac murmur without enlargement of the heart, weakening of the heart sounds and evidences of passive congestion in other organs is, moreover, characteristic of CONGENITAL HEART DISEASE.

It is never possible to make a positive diagnosis as to the exact location of the lesion in congenital heart disease. The location of the murmur and the absence of enlargement of the heart and of changes in the second sounds point strongly in this instance, however, to a defect in the ventricular septum. The slight intensity of the murmur is consistent with either a very small or a large opening. The deepness of the cyanosis on exertion makes it almost certain that it is a large one.

Prognosis. It is impossible to more than guess how long he will live. Judging from the intensity of the cyanosis when he cries, the rapidity of the respiration and the frequent cough, it is probable that he will not live more than a year. He may die suddenly at any time and can hardly be expected to survive any acute disease of the lungs. He may, however, live for a number of years.

Treatment. There is nothing to do for him at present, except to take good care of him. If evidences of failure of compensation develop, the treatment will be that of failure of compensation in general.

CASE 123. Elic S. was born one month before he was expected, after a normal labor, and weighed three pounds. There had been one previous miscarriage. Two younger children were well. Jaundice appeared a few days after birth, but disappeared in a week. He was breast-fed for nine months and did well. He had had no disturbances of digestion since then. He had scarlet fever at two years and whooping-cough at three years. His mother noticed, when he was four months old, that his lips, cheeks and nails were bluish and that at times the whole body was blue. The cyanosis increased rapidly, so that after a short time there was always some general cyanosis present. The intensity of the cyanosis varied, however, from time to time. The cyanosis was increased by exertion, exposure to cold and excitement. He had always been weak muscularly and had never been able to walk far without getting out of breath. He was able to sleep with one pillow and had never had any convulsions, edema or pain. His appetite and digestion were good. He was bright and happy; in fact, seemed perfectly normal, except for the cyanosis and dyspnea on exertion. He was seen when five years old.

Physical Examination. He was fairly developed and nourished, but somewhat flabby muscularly. He was perfectly normal mentally, but restless and excitable. He was able to lie down flat without discomfort. There was marked general cyanosis, which was greater in the extremities and lips than elsewhere. The conjunctivæ were slightly discolored from the cyanosis. There was no bulging of the precordia. The cardiac impulse was palpable in the fourth space in the nipple line, six and one-half cm. to the left of the median line. The left border of the cardiac dullness corresponded to the impulse. The upper border of dullness was at the upper border of the third rib. The right border was four cm. to the right of the median line. The action was regular. The first sound was somewhat short. The second pulmonic sound was louder than the second aortic, but no louder than would be expected at this age. No abnormal sounds were heard. There was no thrill and no dullness under the manubrium. The lungs showed nothing abnormal. The thymus was not

Normal hand.

Clubbing of the fingers in congenital heart disease.

palpable in the suprasternal space. There was no increased dullness over the upper dorsal spinous processes and no change in the respiration or voice sounds in this area. The abdomen was normal. The upper border of the liver flatness was at the lower border of the fifth rib in the nipple line. The liver and spleen were not palpable. The extremities were normal, except for marked clubbing both of the fingers and of the toes. There was no edema. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

The urine was clear in color, acid in reaction, of a specific gravity of 1015, and contained no albumin, sugar or acetone. The sediment contained merely a few small round and squamous cells.

BLOOD.

Hemoglobin,	140% (Sahli)
Red corpuscles,	11,376,000
White corpuscles,	12,000
Small mononuclears,	27%
Large mononuclears,	5%
Polynuclear neutrophiles,	68%

There was no achromia, polychromatophilia or poikilocytosis, and no nucleated red cells were seen.

Diagnosis. The chief abnormalities in this instance are the cyanosis, the clubbing of the extremities and the polycythemia. The normal condition of the lungs and the intensity of the polycythemia exclude disease of the lungs as the cause of the symptoms, while the absence of all signs of enlargement of the tracheo-bronchial lymph nodes and thymus and of pressure on other organs by them shows that they cannot be the cause. The onset of the cyanosis when the boy was still on the breast and the absence of all signs of indigestion is much against an enterogenous cyanosis, which is, moreover, not accompanied by clubbing of the extremities and polycythemia. Methemoglobinemia from drugs can also be excluded for the same reasons. Chronic polycythemia with cyanosis and enlargement of the spleen (erythremia or erythrocytosis megalosplenica) can be ruled out

on the age of the child, the absence of the peculiar bluish-red color, the absence of enlargement of the spleen and the absence of a polynuclear leucocytosis and of nucleated red cells. The cause of the symptoms must be, therefore, some CONGENITAL CARDIAC MALFORMATION. The enlargement of the heart to the right is corroborative evidence in favor of this diagnosis. The absence of a murmur does not count much against it, because it is a well-known fact that there may be no murmur in congenital heart disease, even when other signs are marked. The malformations with which the symptoms are reasonably consistent in this instance are absence of the ventricular septum, transposition or irregular origin of the great vessels and pulmonary atresia with some compensatory malformation. There ought not, however, to be a second pulmonic sound if there is pulmonary atresia, and it should be accentuated if there is a transposition of the vessels. It is idle to speculate as to the exact lesion, however, as it is obviously impossible to determine positively what it is. Fortunately a knowledge of this point is not of importance in relation to the treatment.

Prognosis. He is five years old, has survived scarlet fever and pertussis, has developed fairly well and has no disturbance of the digestion. It seems reasonable to suppose, therefore, that he will live for a number of years. Any disease of the lungs will, however, probably prove rapidly fatal. If he lives, he will not be able to do any active work and will always have to lead a sedentary life.

Treatment. The treatment at present consists in the avoidance of all exertion sufficient to cause shortness of breath. If evidences of failure of compensation, such as edema of the lungs, enlargement of the liver, ascites or anasarca develop, the treatment will be that of failure of compensation in general.

CASE 124. William C.'s father had died of tuberculosis just before he was born. He had had no known exposure to tuberculosis. He had been unusually rugged until he was eight years old, when he had otitis media followed by inflammation of the mastoid and operation. A considerable amount of adenoids was removed at the same time. He was kept out of school for a year, but did not regain his strength. He was easily tired and not nearly as vigorous as before. An enlargement of several of the cervical lymph nodes, which had developed at the time of the mastoid operation, persisted until his tonsils were removed, when he was ten and one-half years old, since when they had become much smaller. He had chicken-pox when eleven and one-half years old and was considerably pulled down by it. Since then he had been generally below par and very easily tired. His appetite had been poor, but he had shown no signs of indigestion. His bowels had moved regularly, and the movements had been normal. He had had no cough. He complained a little of shortness of breath on exertion, but never of palpitation. Once, after unusual exertion, and at another time after getting tired, he had run a temperature between 99° F. and 100° F. for several days. At other times his temperature had been normal. He had been kept very quiet during the last few months and not allowed to take any active exercise. He went to bed early and usually slept about eleven hours, but had no rest during the day. He had grown tall very rapidly during the last six months. He was of a very nervous type and was much worried about himself. He had no bad habits. He was seen when eleven and three-fourths years old.

Physical Examination. He was tall and rather slight, but of fair color. His throat and mouth were healthy and his tongue nearly clean. There was no venous hum in the neck. The cardiac impulse was palpable in the fourth left space, $7\frac{1}{2}$ cm. to the left of the median line. The left border of the relative cardiac dullness was $7\frac{1}{2}$ cm. to the left, and the right border 3 cm. to the right of the median line; the upper border was at the upper border of the third rib. That is, taking his height into consideration, the measurements to the left were a little small, while the others were normal. The cardiac

action was somewhat irregular in rhythm; the rate, 88. The cardiac action was steadied by exertion. The first sound was everywhere of fair strength. It was at times followed, both at the pulmonic and mitral areas, by short murmurs which were not transmitted. The second pulmonic sound was not accentuated. The lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively. Kernig's sign was absent. Numerous lymph nodes, varying in size from that of a pea to that of a large bean, were palpable in the neck. There was no enlargement of the axillary and inguinal and no evidence of enlargement of the bronchial lymph nodes. His weight was eighty-nine and one-fourth pounds (average, seventy-six and one-half pounds). His height was fifty-nine and three-fourths inches (average, fifty-five).

The urine was clear, highly acid in reaction, of a specific gravity of 1,038 and contained no albumin or sugar.

BLOOD.

Hemoglobin,	90%
Red corpuscles,	4,500,000
White corpuscles,	7,200

Smears of the blood showed nothing abnormal in either the red or the white corpuscles.

Diagnosis. The enlargement of the cervical lymph nodes is in all probability not tubercular, because it came on in the course of an acute disease, has never shown any tendency to suppurate and has diminished in size since the tonsils were removed. The fact that his father died of tuberculosis is of no importance, because he was not exposed to tuberculosis from him. There are no evidences of tuberculosis elsewhere. It is reasonably safe to conclude, therefore, that his poor condition is not due to tuberculosis.

The point of chief interest is the condition of the heart. It is certainly not an acute one. Is the trouble organic or functional? Anemic murmurs do not have to be considered because of the condition of his blood and the absence of a venous hum in the neck. The absence of enlargement of the

heart, taken in combination with the strong first sound and the absence of accentuation of the second pulmonic sound, show that there is no dilatation or hypertrophy of the heart, which would certainly be present if there was any chronic leakage at the mitral orifice. The presence of a murmur at the pulmonic orifice and the absence of transmission of the murmurs is also against an organic lesion. The steadying of the heart on exertion, the rapid growth, the nervous temperament, the history of the previous illnesses and the fact that he is about the age of puberty, all point to a functional condition. It is safe to conclude, therefore, that the CARDIAC condition is FUNCTIONAL, not organic.

Prognosis. The prognosis is perfectly good with time. It will probably be several years before he will be strong and vigorous. The irregularity of the heart and the murmurs will probably disappear much sooner.

Treatment. The treatment must be by regulation of his daily life, not by drugs. In the first place, he must be assured that there is nothing serious the matter with him, that his weakness is merely the result of his illness and his rapid growth and that he will surely be all right again. He must not go to school more than half a day. If he does not go at all, he will have too much time to think about himself. He must be amused in quiet ways. He must partly undress and lie down for an hour at noon and rest, even if he does not sleep. He must be in bed at eight. It will be a good thing for him to sleep out of doors. He can walk, drive, ride in an automobile, play golf and work a little about the house, but must not play baseball or football, ride a bicycle or skate. He may have any reasonable food. He should have three good meals and a lunch in the morning. Care must be taken that his bowels move regularly. Tincture of nux vomica, in eight-drop doses, three times daily, before meals, will probably improve his appetite and his general condition.

CASE 125. Samuel C., four and one-half years old, had been perfectly well since an attack of acute nephritis two years before. About two weeks before he was seen he began to complain of pain and stiffness in the ankles, wrists and elbows. He apparently did not feel sick and was not feverish. He had been allowed to be out of doors as usual, although it was winter. He had had no treatment. The day he was seen he had not seemed quite as well, although nothing very definite had appeared. He was seen in the evening.

Physical Examination. He was well developed and nourished and of good color. He did not seem sick. He complained of slight pain when his ankles, wrists and elbows were moved. The right wrist was tender on pressure; the other joints were not. There was no redness, heat or swelling about any of them. The cardiac impulse was visible and palpable in the fifth space, 8 cm. to the left of the median line (the normal is in the fourth space, 6 to 6½ cm. to the left of the median line). The upper border of the relative cardiac dullness was at the lower border of the second rib (normal is in second space), the right border 2½ cm. to the right of the median line (normal), and the left border 8 cm. to the left of the median line (normal is 6 to 6½ cm.). The cardiac action was somewhat irregular; the rate was 104 (normal is 90 to 100). The first sound at the apex was strong, but continued into a short, blowing murmur, transmitted into the axilla. The second sound at the apex was reduplicated. The second sound at the pulmonic area was accentuated. The lungs and abdomen were normal. The liver and spleen were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was no venous hum in the neck. The mouth temperature was 102° F.

Diagnosis. The history and the conditions found in the joints are typical of RHEUMATISM in childhood, at which age marked joint and constitutional symptoms are very uncommon. The disease is, therefore, very often overlooked, as it was in this instance. Unfortunately the heart is involved even more frequently in this mild type of rheumatism in childhood than it is in the severe type in adult life.

There is undoubtedly something abnormal about the heart. The possibilities are acute endocarditis, myocarditis and an anemic murmur. The latter can be at once excluded on the good color, the absence of a venous hum in the neck and the enlargement of the heart. The absence of a murmur at the pulmonic area is also against it. Myocarditis can be ruled out on the character of the impulse, the strength of the first sound and the accentuation of the second sound in the pulmonic area. The absence of enlargement to the right and of much increase in the rate of the pulse is also against it. The diagnosis is, therefore, by elimination, ACUTE ENDOCARDITIS of the mitral valve. The combination of a systolic murmur at the apex with a strong impulse, strong first sound, but little increase in the rate of the heart, enlargement limited to the left side and an accentuation of the second pulmonic sound, is, moreover, characteristic of an early endocarditis of the mitral valve.

Prognosis. There is no immediate danger to life from the endocarditis, the chief immediate danger being the simultaneous involvement of the myocardium and pericardium. When all parts of the heart are involved, the prognosis is always a grave one. There is, however, very little chance of complete recovery. The disease is almost certain to result in permanent deformity of the mitral orifice. There is, moreover, great danger of recurrence of the rheumatism in the future with further damage to the endocardium. It must be remembered in this connection that the murmurs due to acute endocarditis frequently disappear, to be followed later by those due to cicatricial changes in the orifices. The disappearance of the murmur does not, therefore, justify a favorable prognosis. This can only be given when the murmur has not reappeared after an interval of one or two years.

Treatment. The author is one of those who believe that the salicylates do good in rheumatism. It seems reasonable that, if they help rheumatism, they will have a favorable influence upon the endocarditis, which is a manifestation of rheumatism. It is hard to understand, at any rate, how they can do any harm in rheumatism, as some writers claim they do. The most satisfactory preparation of salicylic acid for

children is aspirin. This boy should have five grains every three hours until the joint symptoms and fever are relieved, unless he gets toxic symptoms. If he does, the dose should be reduced. It should be continued in the same dose, three times a day, for several days or a week longer.

The most important thing in the treatment of acute endocarditis in childhood is rest. Everything else is subordinate. He must be kept in bed not only during the acute stage, but for months longer. Three months is the minimum. A week in bed at this time may mean a year of life later. In the beginning he must be kept flat or as nearly flat as is possible. Judgment must be used in this connection, however, because he may fret and fuss so much at being kept flat that he will bring more strain on his heart than if he is allowed to sit up. His life must be most carefully regulated for a year or two after he gets up, and the amount of exertion limited. He will feel perfectly well and will wish to do what other children do. He must, however, be restrained. His whole life must be planned so as to save the heart.

His compensation is perfectly good. There is, therefore, no call for either cardiac stimulants or tonics. If he is restless or uncomfortable, he may be given the bromide of sodium or potassium in five- or ten-grain doses, or morphia in doses of from one thirty-second to one sixteenth of a grain.

There are no special indications as to his diet. He must be given a milk and starchy diet at first. Later, there is no objection to meat and eggs. Special attention must be paid to his nutrition, as the condition of the heart muscle depends to a considerable extent on the general nutrition.

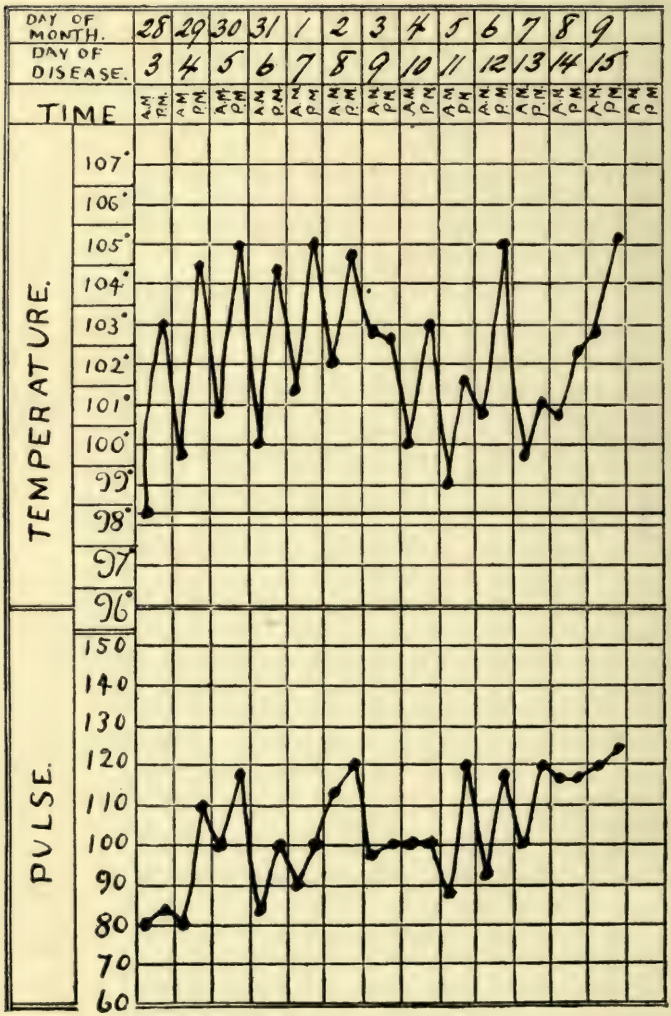


Chart of Case 126.

CASE 126. Carl J., eleven years old, had three brothers living and well. His parents and a sister had died of acute diseases. He had measles and whooping-cough when nine years old and had been circumcised two months before the onset of his illness. The heart was examined at that time, but nothing abnormal was detected. He was taken suddenly sick July 26 with vomiting, fever and headache. The vomiting and headache ceased after twenty-four hours, but the fever continued. He did not complain of sore throat, but the physician who saw him on July 28 found the throat reddened, the tonsils large and the fauces and pharynx covered with purulent material. The heart was not enlarged at that time, but a loud systolic murmur was heard all over the precordia and in the axilla. The rest of the physical examination was negative. The throat cleared up rapidly and no new physical signs developed. The fever continued, however, as is shown by the accompanying chart. He had a chill on August 6 and on August 8 two chills, with two marked exacerbations of temperature. He took his food fairly well and had no disturbance of the digestion, but lost weight and strength very rapidly. He was troubled by headache, mostly occipital, after August 1, and complained constantly of pain in the legs. This was not helped by aspirin, and Roentgenographs showed no disease of the bones or joints. The urine, which was examined July 29, was clear, acid in reaction and contained no albumin or sugar. The sediment showed a few leucocytes and large round cells, but no casts. A skin tuberculin test on July 21 was negative. Widal tests on July 31 and August 9 were negative. Blood cultures on July 31 and August 6 were also negative. The leucocyte count, July 29, was 5600, with 60% of polynuclear cells. It was 12,400, with 85% of polynuclears, on August 6, and on August 9, 12,000 with 80% of polynuclears. No plasmodia malariæ were found at three examinations. He was seen in consultation, August 9.

Physical Examination. He had evidently lost much flesh. He was perfectly clear mentally. There was no rigidity of the neck or neck sign. The pupils were equal and reacted to light. The tongue was considerably coated. The throat

was normal. The cardiac impulse was in the fifth space, seven and one-half cm. from the median line. The left border of dullness was one-half cm. farther out, the right border three and one-half cm. to the right of the median line, the upper border at the upper border of the third rib. The action was regular. The first sound at the mitral area and apex was replaced by a loud, blowing murmur, transmitted into the axilla. The first sound was audible at the base of the heart, as was the murmur. The second sound at the pulmonic area was accentuated. There was no venous hum in the neck. The lungs were normal and there was no evidence of enlargement of the tracheo-bronchial lymph nodes. The liver was not palpable. The upper border of the splenic dullness was at the ninth rib. The spleen was not palpable. The abdomen was level, soft and tympanitic. There were no rose spots. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. He was generally hyperesthetic, especially in the legs. The inguinal and axillary lymph nodes were palpable and seemed tender. The rectal temperature was 105.2° F.; the pulse, 124; the respiration, 30.

Diagnosis. The diseases to be considered in this instance are typhoid fever, malaria, acute miliary tuberculosis, rheumatism with endocarditis and malignant endocarditis. The temperature and pulse rate, while not characteristic of typhoid fever, are not inconsistent with it. The increase in the number of white cells is so slight that it does not count against it. Typhoid fever can be positively excluded, however, on the negative blood culture on the sixth day, the negative Widal test on the fifteenth day of the disease, the absence of rose spots and enlargement of the spleen at two weeks, and the relative increase of the polynuclear leucocytes. The onset was quicker, moreover, than is usual in typhoid at this age. Malaria is suggested by the irregularity of the temperature, the chills and the absence of a marked leucocytosis. It can be ruled out on the absence of enlargement of the spleen, the failure to find plasmodia on three occasions and the relative increase of the polynuclear leucocytes. The irregular temperature and the rapid loss of weight and strength are suggestive of the typhoidal type

of acute miliary tuberculosis, as is the absence of marked leucocytosis. The negative tuberculin test does not count against it, because it is very often negative in this type of tuberculosis. There are, however, no physical signs of any primary focus and the pulse is slower than is usual in this disease. It would be hard to exclude it, however, if the signs in the heart did not point so strongly to trouble there. The presence of these signs is, moreover, strong negative evidence against typhoid fever and malaria. Rheumatism with endocarditis is suggested by the pains in the extremities and the signs of a cardiac lesion. The pains are general and indefinite, however, there are no evidences of involvement of the joints and aspirin has not relieved them. The general condition is much worse than would be expected if this was the trouble, when it is taken into consideration that the heart is but little enlarged. It seems as if there must be something more serious than this the matter with him. The high, irregular temperature, the chills and the rapid loss of weight and strength show that there is a septic infection of some sort. The absence of all evidences of infection, except in the heart, proves that this must be the seat of the infection. The diagnosis of malignant endocarditis seems, therefore, a reasonable one. The relative increase in the number of polynuclear leucocytes is also in favor of this diagnosis. The reason that the leucocytosis is not larger, as it would be expected to be, is probably because the system is overwhelmed by the infection. It is harder to explain the negative blood cultures. All that can be said is that, while blood cultures are usually positive in malignant endocarditis, they are not always so. The negative blood cultures do not seem sufficient, therefore, to in any way counterbalance the evidence in favor of MALIGNANT ENDOCARDITIS, which is the only diagnosis consistent with the symptoms and which is undoubtedly the correct one. The infection presumably came from the throat.

Prognosis. The prognosis is absolutely hopeless. He will probably not live more than a week or ten days, but may linger on for several weeks.

Treatment. There is no curative treatment. All that can be done is to make him as comfortable as possible.

CASE 127. Philip N. was admitted to the Children's Hospital, October 10, when seven and one-half years old. His parents and five other children were alive and well. Five had died of various diseases. There had been no miscarriages. He had had no known exposure to tuberculosis. He had always been well, except for measles and whooping-cough in infancy, until he had rheumatism a year before. This was complicated by acute endocarditis and chorea. He was in bed for eleven weeks, after which he made a slow but good recovery. He had played about with the other boys all summer and had had no shortness of breath or palpitation.

He was taken suddenly sick October 3 with headache, fever and dyspnea. Pain, redness and swelling appeared in the right knee the next day and since then the other knee, the right ankle and both wrists had been affected. He had also had some pain in the precordia, which at times ran up into the left shoulder. He had taken his food well, had not vomited and had had regular movements of the bowels.

Physical Examination. He was well developed and nourished and moderately pale. There was a tinge of cyanosis in the cheeks, about the mouth and in the hands and feet. His expression was anxious and he was unable to lie down with comfort. The tongue was covered with a moist, white coat. The throat was normal. The cardiac impulse was heaving. It was seen and felt most distinctly in the fifth space, ten and one-half cm. to the left of the median line. The left border of the cardiac dullness was eleven cm. to the left of the median line (normal is seven cm.) and the right border four and one-half cm. to the right of the median line (normal is two and one-half cm.). The cardio-hepatic angle was acute. The upper border of the cardiac dullness was in the second space (normal is under third rib). The action was regular, the rate 140. The first sound at the apex was somewhat feeble and was followed by a loud, blowing murmur, which was transmitted into the axilla and back. Both sounds were feeble in the aortic area. The second sound in this area was followed by a short, harsh murmur, which was heard much more distinctly in the third left space and which could be followed down to the apex, where it became inaudible.

The second sound in the pulmonic area was louder than that in the aortic area. There was a Corrigan pulse, a capillary pulse and a pistol-shot sound in the groin. The lungs were normal, except for a few fine, moist râles at the bases behind. The upper border of the liver flatness in the nipple line was at the upper border of the fifth rib; the lower border was palpable three cm. below the costal border in the same line. The spleen was just palpable. The abdomen was slightly distended, but otherwise normal. The extremities showed nothing abnormal, except slight clubbing of the fingers and toes. There was no tenderness or edema. The knee-jerks were equal and lively. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99.2° F.; the pulse, 140; the respiration, 44.

The urine was of normal color, acid in reaction, of a specific gravity of 1023, and contained no albumin, sugar or bile.

The white corpuscles numbered 15,600.

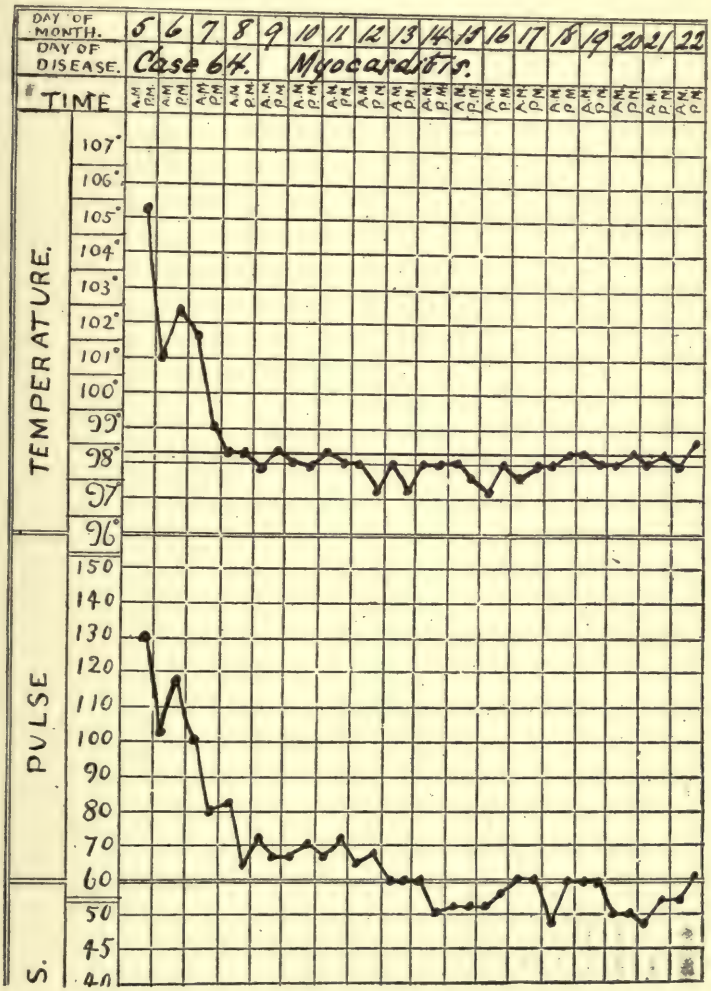
Diagnosis. He undoubtedly has CHRONIC VALVULAR DISEASE OF THE HEART. If the marked enlargement of the heart was due to an acute disease of the heart, whether endocarditis, myocarditis or a combination of the two, occurring in association with the RHEUMATISM during the last week, the impulse would not be heaving, the murmurs would not be so loud and the signs of failure of compensation would be very marked. The systolic murmur at the apex is indicative of mitral insufficiency. The characteristics of the diastolic murmur are those of the murmur of aortic insufficiency. This diagnosis is confirmed by the Corrigan pulse, the capillary pulse and the pistol-shot sound in the groins. The increase in the rate of the pulse and respiration are out of proportion to the increase in the temperature and greater than would be expected in chronic valvular disease as well compensated as it seems to be in this instance. This excessive increase in the rate of the pulse and respiration, together with the slight tinge of cyanosis, the anxious expression, the tendency to orthopœa and the precordial pain, show that there is some acute cardiac lesion in addition to the chronic valvular disease. The absence of a friction rub and of the signs of effusion into the pericardium shows that the peri-

cardium is not involved. It is probable that, as is usual in such cases, both the endocardium and myocardium are affected. The relatively strong first sound shows, however, that the myocardium is not severely involved. A probable diagnosis of ACUTE ENDOCARDITIS seems, therefore, justifiable. The fine râles in the back and the enlargement of the liver and spleen are undoubtedly the result of the disease of the heart.

Prognosis. The rheumatism will yield quickly to treatment and the acute endocarditis will, in all probability, quiet down. He will be left, however, with a heart more damaged than it was before. This damage is so great that, although it is probable that compensation will soon be reëstablished, it is only a question of time when it will break down again. It may be reëstablished several times, but it will sooner or later give out once for all. He will almost certainly die of cardiac failure within a few years.

Treatment. The treatment of rheumatism and acute endocarditis, as well as inferentially of chronic valvular disease, is discussed elsewhere (see Case 125). He should be given five grains of aspirin every three hours for the present. He should be kept as quiet as possible in bed and bolstered up enough so that he can breathe freely. His diet should consist of milk prepared in various ways, starches, ice cream and custard. He should be given five or six small feedings during the twenty-four hours. Water should not be pushed, as large amounts increase the strain on the circulation. If he is restless and uncomfortable, he should be given bromide of soda in 15 grain doses. If this does not quiet him, it will be wise to give him morphia in doses of from $\frac{1}{24}$ to $\frac{1}{16}$ of a grain. While digitalis is not indicated in acute endocarditis and myocarditis, it is useful when there is failure of compensation in the course of chronic valvular disease, as in this instance. He should be given five minims of the tincture of digitalis every six hours; more if necessary.

CASE 128. Ernest M., nine years old, was admitted to the Children's Hospital January 5, on the sixth day of a pneumonia of the left lower lobe. He was in good condition and the physical examination showed nothing else abnormal. The



ERNEST M. CASE 128.

cardiac impulse was visible and palpable in the fifth space, 7 cm. to the left of the median line and just inside the nipple line. The upper border of the relative cardiac dullness was at the upper border of the third rib; the left border corre-

sponded to the impulse and the right border was 2½ cm. to the right of the median line (all normal). The action was regular. The first sound was of fair quality. The second sounds were alike. There were no murmurs.

The crisis, as will be seen by the chart, occupied two days. The temperature reached normal the afternoon of January 7. The pulse remained good during the crisis. The temperature remained down and the lung began to clear at once, but the pulse became infrequent and irregular the night of the 8th. The examination the next morning, January 9, was as follows:

Physical Examination. He was perfectly comfortable and of good color. The cardiac impulse was wavy and visible in several spaces. It was most distinctly palpable in the fifth space, 8½ cm. to the left of the median line. The upper border of the relative cardiac dullness was in the second space, the left border was just outside the point of maximum impulse and the right was 4 cm. to the right of the median line. The action was irregular in both force and rhythm; the rate was 68 (normal is 80 to 90). All the beats were transmitted to the wrist. The first sound was everywhere short and somewhat feeble. The second sounds were alike. There were no murmurs. There was still a little dullness and a few moist râles over the left lower lobe. The physical examination showed nothing else abnormal.

Diagnosis. The physical signs are those of weakness and dilatation of the heart. The weakness and dilatation cannot be the results of an endocarditis, because the heart was normal four days before and no leakage which did not show then could possibly have caused so much dilatation and weakness in four days. There is no cause outside of the heart to account for its sudden failure. The cause of the dilatation and weakness must, therefore, be in the heart wall. That is, there is a MYOCARDITIS. The diminution of the second sound at the pulmonic area at entrance (the second pulmonic sound is normally louder than the second aortic at this age) showed that the right ventricle was unable to meet the increased resistance in the pulmonary circulation and gave warning of what happened later.

Prognosis. The prognosis is a grave one. A marked

diminution in the pulse-rate in myocarditis is as serious, if not more so, than a marked increase in the rate. He may die at any time; he may slowly improve and finally recover entirely. It is impossible to forecast what will happen. The outlook depends to a considerable extent on the treatment.

Treatment. The most important part of his treatment is quiet. He must be kept perfectly flat and not allowed to sit up for any reason whatever. He must be kept flat, or nearly flat, until the cardiac action and rate are normal and all signs of dilatation and weakness have disappeared. He may then begin to gradually get up and about. Alcohol is useless in myocarditis, except as a food. In large doses it undoubtedly does harm. Strychnia may possibly help some. Digitalis cannot act on a degenerated muscle. Nitroglycerin is dangerous because it predisposes to vasomotor paralysis. There is, therefore, no drug treatment indicated at present. He may have liquids in moderate amounts, soft solids and eggs. It will be wiser to give him small meals five or six times in the twenty-four hours than large ones at longer intervals.

CASE 129. Mary M., seven years old, had had measles, whooping-cough and rheumatism in the past. She complained of "pain in her stomach" January 3, and two days later began to have pain in the knees and could not use her legs. The pain left her knees January 7 and she began to complain of precordial pain and shortness of breath. Twitching of the face and extremities began January 9. She had, nevertheless, taken food fairly well and had had no disturbance of the digestion. She was admitted to the Children's Hospital, January 13, and was seen soon after.

Physical Examination. She was fairly developed and nourished, but very pale. There was moderate cyanosis of the lips and cheeks. She was bolstered up on pillows, was gasping for breath and took almost no notice of what was going on about her. The cardiac impulse was just palpable in the fifth left space, a little outside the nipple line. The left border of the cardiac dullness was in the midaxillary line, the upper border at the upper border of the second rib and at the middle of the manubrium, whence the right border ran diagonally downward and outward, reaching the upper border of the liver flatness at the sixth rib, just inside the right nipple line. The cardiac action was regular, but the sounds were very feeble. The second pulmonic was louder than the second aortic sound. No murmurs were heard and there was no friction rub. There was marked dullness, with bronchial respiration, in the left back below the level of the middle of the scapula between the median and scapular lines. There were many fine, moist râles throughout both backs. The lower border of the liver was palpable at about the level of the navel in the nipple line. The liver was tender. The spleen was not palpable. There was no edema of the face or extremities. There were occasional involuntary twitchings of the face and extremities. No further examination was made, because of her critical condition. The mouth temperature was 101.2° F.; the pulse, 132; the respiration, 40.

Diagnosis. The position of the impulse, well inside the left border of the cardiac dullness, the obtuse cardio-hepatic angle and the relatively slight increase in the rate of the heart,

together with the feebleness of the heart sounds while the second pulmonic is louder than the second aortic sound, are so different from the physical signs found in dilatation of the heart with failure of compensation, the only condition with which it could be confused, that an absolute diagnosis of PERICARDITIS WITH EFFUSION is justified. The area of dullness and bronchial respiration in the left back is presumably the result of compression of the lung and is corroborative evidence in favor of a pericardial effusion. The fine râles in the backs are indicative of edema of the lungs from interference with the pulmonary circulation. The enlargement and tenderness of the liver are undoubtedly due to trouble in the heart, but suggest that there is some other lesion in addition to the pericarditis. The history of rheumatism in the past and the loud second pulmonic sound suggest that there is also some valvular lesion. It is impossible to determine at present, however, whether this is the case or not. She has, of course, RHEUMATISM AND CHOREA as well as pericarditis. The pericarditis having developed in the course of rheumatism and chorea, the effusion is almost certainly serous in character.

Prognosis. She will die within a few hours, if the fluid is not removed at once from the pericardium. It is impossible to say whether it will reaccumulate after its removal, but the chances are that it will not. No more definite prognosis can be given until the condition of the myocardium and endocardium is determined after the withdrawal of the fluid. If she recovers, she will probably be left with an adherent pericardium, which may or may not cause trouble in the future.

Treatment. The pericardium must be emptied at once. The fifth right interspace is, as a rule, the best place to tap it. The trocar should be introduced in this instance about two cm. inside of the right nipple line, which will be far enough out to avoid the internal mammary artery. As much fluid as possible should be withdrawn. It is probable that eight or ten ounces will be obtained. A light icebag should then be suspended over the precordia in such a way that it will not cause pressure. It will probably make her more comfortable and may, perhaps, hinder the reaccumulation of the fluid. It

will be well also to give her three drops of the tincture of digitalis every four hours for the present. If disease of the endocardium is discovered after the withdrawal of the fluid, it may be necessary to give her larger doses. The treatment of pericarditis is given in more detail in Case 130.

CASE 130. Levi P., fifteen years old, had had repeated attacks of rheumatic fever since he was four years old. He began to be short of breath on exertion when he was fourteen, but this was never severe enough to cause any inconvenience. He occasionally suffered from palpitation. He had another attack of rheumatic fever the latter part of May. Since then dyspnea and palpitation had been very troublesome and any exertion completely exhausted him. His appetite was good and his bowels moved regularly. He had no signs of indigestion. He had a slight cough, but no expectoration. The dyspnea and palpitation finally became so troublesome that he gave up and went to bed June 16. He was able to lie down, but was more comfortable sitting up. Rest in bed made him more comfortable until June 20, when he began to complain of pain and oppression in the chest. He became rapidly worse, so that on the 22d he was unable to lie down with comfort, was restless and had begun to vomit. The temperature, which had been running between normal and 101° F., gradually went up to 102° F., and the rate of the pulse and respiration rose from 100 and 25 to 140 and 40, respectively. He was seen in consultation June 22.

Physical Examination. He was well developed and nourished. He was restless and unable to lie down. His expression was anxious. He was everywhere slightly cyanotic. The cardiac impulse was not visible; it was palpable in the fourth space, midway between the sternum and the nipple (normal is fifth space, 1 cm. inside the nipple). The upper border of the relative cardiac dullness was at the upper border of the second rib (normal is middle of third rib); the left border 13 cm. (normal is 8 or 9 cm.) to the left of the median line; the right border 6 cm. (normal is 3 to 4 cm.) to the right of the median line in the fourth space, and 7 cm. to the right of the median line in the fifth space. The action was regular; the rate, 140. The heart sounds were markedly feeble. The first sound at the apex was preceded by a faint, rumbling sound and directly followed by a soft, blowing sound which was transmitted toward the axilla. The second pulmonic sound was somewhat louder than the second aortic. There was a soft, double, rubbing sound close to the ear and increased by

pressure of the stethoscope, synchronous with the heart beat, under the manubrium and in the second spaces. The pulse was fairly strong. There was an area of dullness, with bronchovesicular respiration and slightly increased voice sounds, at the base of the left lung, extending outward about 7 cm. from the median line and upward about 5 cm. There were numerous very fine, moist râles in both lower backs. The lungs were otherwise normal. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line; the lower border was not palpable. The spleen was not palpable. The abdomen was normal. The extremities showed nothing abnormal. There was no spasm or paralysis and no edema.

The urine was high, acid in reaction, of a specific gravity of 1,024 and contained neither albumin nor sugar. The sediment showed nothing abnormal.

Diagnosis. The trouble is, of course, entirely cardiac. The condition in the heart is, however, a fairly complicated one. The location of the impulse well inside the left border of the cardiac dullness, the combination of feeble heart sounds with a regular action, a reasonably strong pulse, and an accentuated second pulmonic sound, and the extension of the right border of dullness farther to the right in the fifth than in the fourth space (thus making the cardio-hepatic angle obtuse) prove that there is a PERICARDIAL EFFUSION. The peculiar characteristics of the double rubbing sound under the manubrium and in the second spaces show that there is also a DRY PERICARDITIS at the base. This is corroborative evidence of pericardial effusion. The presence of cyanosis and distress without edema and enlargement of the liver and spleen also counts in favor of a pericardial effusion and against a dilatation of the heart. The effusion developed immediately after an attack of rheumatism, and is, therefore, almost certainly serous. The absence of marked irregularity in the temperature and of chills and sweating is also in favor of a serous fluid.

The double murmur at the apex shows that there is a lesion at the MITRAL orifice, certainly INSUFFICIENCY, probably STENOSIS, perhaps only roughening of the orifice. The

effusion into the pericardium makes it impossible to determine the size of the heart. The accentuation of the second pulmonic sound shows, however, that there must be hypertrophy of the heart and that, if there are both dilatation and hypertrophy, the hypertrophy is in the ascendance. The history of repeated attacks of rheumatism and of dyspnea and palpitation before the present illness shows that the lesion is a chronic one. The accentuation of the second pulmonic sound is corroborative evidence. The strength of the pulse, the good second sound and the regularity of the heart show that the myocardium is but little, if at all, affected.

The area of dullness and bronchovesicular respiration in the lower left back is due to compression of the lung by the pericardial effusion. The râles show a small amount of edema of the lungs.

Prognosis. The prognosis in this instance, as always in pericarditis with effusion, especially if associated with chronic valvular lesions, is a very grave one. The most favorable point here is the absence of myocardial involvement. There is a reasonable chance, perhaps one in four, that he will survive the present acute condition. He will be left, however, not only with a chronic valvular lesion, but also with an adherent pericardium. He is also very liable to have more attacks of rheumatism and further involvement of the heart. If he survives the present attack, the chances are, therefore, that he will live but a few years.

Treatment. The first thing to be decided is whether it is advisable to tap the pericardium. The heart is standing up to the increased work very well, as is shown by the regularity of its action, the good pulse and the accentuation of the second pulmonic sound; there is almost no edema of the lungs and no signs of passive congestion elsewhere. If he can be kept under close observation, it will be wise to delay aspiration in the hope that the effusion will diminish rather than increase. If the heart weakens or signs of passive congestion appear, the pericardium must be tapped at once. Blisters and the application of other counterirritants to the precordia can do no good, will make him uncomfortable and increase the chances of septic infection. A light ice-bag, suspended over the pre-

cordia so as not to cause pressure, may make him more comfortable and in some instances seems to favor the absorption of the fluid. Tincture of digitalis, in doses of five drops every four hours, will help the heart to meet the increased work thrown on it by the pressure of the fluid in the pericardium. This dose may be doubled or trebled, if necessary. He may sit up or lie down, according to which is the more comfortable. Fresh air will make his breathing easier. Oxygen may be given, if necessary. There is no objection to morphine, in doses of from one sixteenth to one eighth of a grain, if he is very uncomfortable.

He must be fed often with small amounts of liquids and soft solids, since swallowing is often very painful and chewing tiresome.

CASE 131. Clarence G., eleven years old, was the child of healthy parents. There was nothing in the family history to suggest syphilis. There was no tuberculosis in the family and he had had no known exposure to it. He was born at full term after a normal labor and was normal at birth. He was breast-fed and was very well as a baby. He had measles and whooping-cough when five, diphtheria when six, scarlet fever when seven, and chicken-pox when nine years old. He had a short indefinite illness, associated with pains in the extremities, in January, 1907, which was called "grippe." His abdomen began to swell about the first of April, 1907. Some months later he began to be short of breath and to have a little swelling of the legs. The swelling of the abdomen and the dyspnea did not change much, but the swelling of the extremities often disappeared entirely for a time. His appetite and digestion continued good. Recently he had been unable to lie down with comfort, had had some cough and more swelling of the legs. He had had no fever. He was seen September 9, 1908.

Physical Examination. He was well developed and nourished and of good color, but unable to lie down without much discomfort. There was no edema of the face or chest, and no enlargement of the superficial veins of the chest. There was no tracheal tug and no diastolic collapse of the veins in the neck. The tongue was clean, the throat normal. There was no dullness under the manubrium. The cardiac impulse was not visible and was only feebly palpable in the region of the nipple. There was no systolic retraction either here or in the back. The upper border of the relative cardiac dullness was at the upper border of the third rib; the left, just outside the left nipple (normal is 1 cm. inside); the right, 5 cm. to the right of the median line (normal is 3 cm. to the right of the median line). The cardio-hepatic angle was acute. The action was regular. The first sound was a little short and sounded a little distant. The second pulmonic sound was not accentuated. There were no murmurs. There was dullness, changing to flatness toward the base, on the left side below the spine of the scapula behind, the fifth rib in the axilla and the third rib in front. The respiration and voice sounds in

this area were somewhat diminished in intensity, but not changed in character. The vocal fremitus was somewhat diminished. A few râles were heard. There was dullness over the whole right back with a few fine, moist râles at the base. The abdomen was much and symmetrically enlarged. There was no enlargement of the superficial veins. There was flatness in the flanks and hypogastrium, the upper border of the flatness being concave when he lay on his back. The area of flatness changed with change of position and there was a definite fluid wave. No masses were felt. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line (normal is at the upper border of the sixth rib); the lower border of the liver was palpable 11 cm. below the costal border in the nipple line (not normally palpable). The spleen was not palpable. There was some edema of the external genitals and legs. The pulse was stronger in the left than in the right wrist, and was of the paradoxical type. There was no enlargement of the peripheral lymph nodes.

The urine was normal in color, acid in reaction and of a specific gravity of 1,025. It showed a very slight trace of albumin, but did not contain sugar. The sediment showed an occasional hyaline and fine granular cast, a few free leucocytes and many squamous cells.

BLOOD.

Hemoglobin,	80%
Red corpuscles,	5,600,000
White corpuscles,	6,700
Mononuclears,	22%
Polynuclear neutrophiles,	76%
Eosinophiles,	1%
Myelocytes,	1%

There was no variation in the size or shape of the red cells and no stippling.

A skin tuberculin test was negative.

Diagnosis. The most reasonable explanation of this boy's condition is as follows: The illness which was called " grippe " was in all probability rheumatism. He developed a low-grade pericarditis and mediastinitis which resulted in the oblitera-

tion of the pericardial cavity and the formation of adhesions between the pericardium and the mediastinal tissues. The negative tuberculin test shows that this process was not tubercular, as it sometimes is. The points in favor of this assumption are the feeble cardiac impulse and the enlargement of the area of dullness in connection with normal heart sounds, the paradoxical pulse and the difference in the strength of the pulse in the two wrists. Many other signs, sometimes present in this condition, are, it is true, lacking, but these seem sufficient to justify the diagnosis.

The inflammatory process extended to the pleuræ and resulted in the formation of pleural adhesions and thickening, which account for the signs in the backs. The pleural adhesions interfere with expansion of the lungs, as does the pressure of the distended abdomen and of the enlarged liver, and cause a congestion at the bases, which accounts for the râles.

The chronic adhesive pericarditis produced a cirrhosis of the liver. This type of cirrhosis is a peculiar one and due only in part to passive congestion. It is not accompanied by the signs of congestion in other organs. The first symptom of this condition which is usually noticed is, as in this instance, enlargement of the abdomen as the result of ascites. The edema of the external genitals and legs is due to the pressure of the fluid in the abdomen on the inferior vena cava, not to passive congestion. The changes in the urine are presumably largely due to passive congestion of the kidneys from the pressure of the ascitic fluid on the renal veins and cava. The final diagnosis is, therefore, CHRONIC ADHESIVE PERICARDITIS, with sequelæ.

Prognosis. There is, of course, no cure for the lesions in the pericardium, mediastinum, pleuræ and liver. He will probably live, however, for a number of years.

Treatment. Tapping the abdomen from time to time will make him much more comfortable. Other treatment must be symptomatic.

SECTION IX.

DISEASES OF THE LIVER.

CASE 132. Richard B. was weaned suddenly July 1, when about nine months old, because his mother was found to be pregnant. He was very large at birth and had gained weight very rapidly. He was not as active, either physically or mentally, as most babies of his age. He was given a very improper diet and after a few days began to vomit and have loose, undigested movements. A careful physical examination, made by a physician who saw him July 11, showed the edge of the liver 2 cm. below the costal border in the nipple line. He was then cleaned out thoroughly and given only water. He was kept on water some days, nutrient enemata being given in addition. These were, however, not well retained. After about ten days he was given cereal waters, which he did not like and of which he took very little. He continued to have from three to four loose, yellow movements daily and, in consequence, he was given no milk until August 1, when he was put on a mixture of one part of skimmed milk and three parts of arrowroot water. He took about twenty-four ounces of this mixture in twenty-four hours. His movements had become a little firmer since the milk was begun. He had been cleaned out thoroughly several times during the last three weeks and had had his bowels irrigated once or twice daily. He had been taking bismuth steadily, as well as three drops of whiskey every three hours. His temperature had varied from normal to 100° F. He lay quietly most of the time and seldom cried, although he occasionally whined. The physician had noticed a hard swelling in the abdomen about ten days before. It had steadily increased in size. He was seen in consultation August 4.

Physical Examination. He was still a good-sized baby, although he had evidently lost much weight. He was very

pale and paid very little attention to anything that was done to him. The anterior fontanelle was 3 cm. in diameter and somewhat depressed. The bones of the skull did not overlap. There was no rigidity of the neck. There was a venous hum in the neck. The pupils were equal and reacted to light. The tongue was slightly coated; the mouth and throat were normal. He had six teeth. The heart and lungs were normal. The upper border of the liver flatness in the nipple line was at the upper border of the fifth rib. The edge of the liver could be felt running across the abdomen just above the right anterior superior spine to the left costal border in the nipple line. The liver was hard, the surface smooth, the edge slightly rounded. It was slightly tender. The spleen was not palpable. The abdomen was otherwise normal. The extremities were normal except for slight edema of the feet. There was no spasm or paralysis. The knee-jerks were equal and feeble. Kernig's sign was absent. There was a fine purpuric eruption on the abdomen and on the feet. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98° F.

The urine was pale, acid in reaction, and of a specific gravity of 1,010. It contained neither albumin nor sugar.

Diagnosis. The most striking thing in the physical examination is the enlargement of the liver, which has developed in less than three weeks. This enlargement has come on too rapidly to be due to any form of cirrhosis; it cannot be due to passive congestion, because the heart and lungs are normal; there is no cause for amyloid change; the enlargement is too uniform for malignant disease. The only reasonable explanation for the enlargement is fatty change. The cause of this fatty change is not difficult to find. He has had practically no nourishment for more than three weeks, and must also have had a certain amount of toxic absorption from the intestines during this time. Disturbance of nutrition is one of the most common causes of fatty change in the liver, and intestinal toxemia in infancy almost always causes fatty degeneration of the liver. The pathological condition in the liver is undoubtedly a mixture of fatty infiltration and degeneration, the infiltration being the more important. The

hard, smooth surface and the slightly rounded edge are also characteristic of the fatty liver. The diagnosis of "FATTY LIVER" is, therefore, justified.

The pallor and the venous hum in the neck are signs of anemia, which is undoubtedly also due to the disturbance of the nutrition from the lack of food. The purpuric eruption is, likewise, merely a sign of disturbed nutrition.

Prognosis. The prognosis is a serious one. It is impossible to determine at once whether or not the disturbance of nutrition has progressed so far that recovery is impossible when proper food is given. Time alone can settle this point.

Treatment. The only food which is likely to be utilized in this instance is human milk. This should be obtained at any cost. If he will not nurse or take it well from the bottle, it must be given through a tube passed through the mouth. If human milk cannot be obtained, a modified milk, low in fat and high in sugar and proteids, will be the best substitute. A mixture containing 1.00% of fat, 7.00% of sugar and 2.00% of proteids is a suitable one. There are no drugs that will help him. It is important, of course, to handle him as little as possible, to keep him warm and to give him a large supply of sunlight and fresh air.

CASE 133. William H.'s father and mother were living and well, as were three other children, one older and two younger than the patient. There had been no deaths in the family, but his mother had miscarried after her first child was born. He had had no known exposure to tuberculosis. He was born at full term and had always been well except for an attack of bronchopneumonia when he was a month old, and measles and mumps when he was three years old. His digestion had always been good. No history of alcoholism could be obtained.

He had been running down since the early spring, but was still able to be up and about most of the time. He was often drowsy and frequently complained of headache. He had been more or less jaundiced since May. The skin was nearly clear at times, but the eyes were always yellow. His appetite was good and he did not vomit or complain of pain in the abdomen. The bowels moved daily; the movements were rather light in color, but never gray or white. The urine was often dark colored and had recently stained his clothing yellow. He was seen September 26, when six years old.

Physical Examination. He was well-developed and fairly nourished. The skin, conjunctivæ and mucous membranes were distinctly yellow. His tongue was clean; his teeth in fair condition. The throat was normal. The cardiac impulse was palpable in the fourth space in the nipple line, 6 cm. to the left of the median line. The upper border of the relative cardiac dullness was at the upper border of the third rib, the right border $2\frac{1}{2}$ cm. to the right of the median line. The action was regular. The first sound was of fair strength, but was followed at the apex and pulmonic area by very faint murmurs, which were not transmitted. The second pulmonic sound was not accentuated. There was a venous hum in the neck. The lungs were normal. The upper border of the liver flatness was in the fifth space; the lower border was palpable 4 cm. below the costal border in the nipple line. The edge was somewhat rounded, the surface smooth. The gall bladder was not palpable, no masses could be made out, and the liver was not tender. The spleen was not palpable and was not enlarged to percussion. The abdomen was moderately dis-

tended and the superficial veins in the upper portion enlarged. There was slight dullness in the flanks, but it did not change with change of position, and there was no fluid wave. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no edema of the extremities. There was no enlargement of the peripheral lymph nodes. There was no eruption and no scars of old eruptions. There were no mucous patches or rhagades. The rectal temperature was normal.

The urine was dark in color, acid in reaction, of a specific gravity of 1,030, and contained the slightest possible trace of albumin and much bile, but no sugar. The sediment showed many small round cells, a few red blood corpuscles, leucocytes and squamous cells, and an occasional hyaline and fine granular cast.

The stools were loose, brownish and foul, and were shown by chemical examination to contain bile pigment.

The leucocyte count was 9,900.

A skin tuberculin test was negative.

Diagnosis. Syphilis of the liver can be ruled out on the good family history and the absence of all other signs of syphilis. Less important points against syphilis of the liver are the presence of jaundice and the absence of enlargement of the spleen. Tuberculosis of the liver can be excluded on the negative tuberculin test. The facts that there are two murmurs, that they are not transmitted, that the second pulmonic sound is not increased, that the heart is not enlarged and that there is a venous hum in the neck show that the murmurs in the heart are anemic. The heart being otherwise normal, cirrhosis of the liver secondary to chronic adhesive pericarditis can be eliminated. The presence of bile in the stools rules out duodenal indigestion and obstruction of the large bile ducts. Abscess of the liver can be excluded on the absence of fever and the low white count. The marked jaundice and the beginning ascites are also against it. The smooth surface of the liver and the presence of jaundice without obstruction of the large ducts makes a new growth extremely improbable. The diagnosis is, therefore, by exclusion, CIRRHOSIS OF THE LIVER. The absence of enlargement of the

spleen, which is one of the earliest signs of hypertrophic cirrhosis, and without which this diagnosis is not justified, makes cirrhosis of the atrophic variety, in the pre-atrophic stage, the most probable diagnosis. There is nothing in the history to account for the development of the cirrhosis, since chronic alcoholism and disease of the gastro-enteric tract can be excluded.

Prognosis. There is no chance for recovery. He will probably not live many months.

Treatment. The treatment can be only symptomatic.

CASE 134. Richard D. was seen in consultation when six years old. His mother had had a cancer of the breast removed eight years before. She was well for six years, when she had a recurrence in the liver and glands, and died a year later. He had always been well before the present illness.

He had not been up to mark since an attack of chicken-pox several weeks before he was seen. There had, however, been no definite symptoms. Enlargement of the abdomen and of the superficial lymph nodes was first noticed a week before. The abdomen had increased in size very rapidly during the week. His appetite had fallen off, but there had been no nausea, vomiting or pain in the abdomen. The bowels had moved regularly; the movements were of good color and looked perfectly digested. He had lost weight, strength and color very rapidly during the week. The temperature had been moderately elevated during the early part of the week, but had been normal for three days.

Physical Examination. He was well developed and nourished, but had evidently lost considerable weight and color. There was no jaundice. The tongue was nearly clean; the throat normal. The heart and lungs were normal. The abdomen was much enlarged and there was distinct bulging in the epigastrium. The superficial abdominal veins were moderately enlarged. The upper border of the liver flatness in front was at the lower border of the fifth rib; behind, in the eighth space on the right and the ninth space on the left side. The lower border of the liver reached to the right anterior superior spine, ran across the abdomen midway between the pubes and the navel and thence nearly to the left anterior superior spine. The left border was concealed by the greatly enlarged spleen, which filled up the left flank and overlapped the liver. The surface of the liver was markedly irregular. Several masses, the size of hens' eggs, were easily felt, and there was one, the size of an orange, in the epigastrium. The liver was slightly tender. There were no evidences of fluid in the abdomen. The kidneys were not palpable. There was no edema of the extremities, which were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There

were numerous lymph nodes, varying in size from that of a bean to that of a walnut, in the neck, a few small ones in the axillæ, and several, the size of marbles, in the groins.

The urine was normal in color, acid in reaction, of a specific gravity of 1,015 and contained neither albumin, sugar nor bile. The sediment showed nothing abnormal.

Stained specimens of the blood showed slight achromia, but no irregularity in the size or shape of the red corpuscles and no nucleated forms. There were no plasmodia and no leucocytosis. There were fifty-four polymorphonuclear neutrophiles to forty-six mononuclear cells.

Diagnosis. The diagnosis lies between malignant disease of the liver and acute lymphatic leukemia in an aleukemic stage. The points which suggest leukemia most strongly are the enlargement of the spleen and of the peripheral lymph nodes. It is true that in very rare instances there are times in the course of acute leukemia in which the number of white cells is not increased. In such instances, however, the proportion of mononuclear cells remains much higher than in this instance, in which the number of mononuclear cells is not much above the normal limit. Primary malignant disease of the liver is extremely rare, there being but thirty-nine cases on record. The trouble in the liver in this instance is, therefore, almost certainly secondary. The usual location of the primary lesion is in the suprarenal capsule. The enlargement of the spleen and lymph nodes is, therefore, like that of the liver, probably due to metastatic malignant involvement rather than to leukemia. The diagnosis of secondary MALIGNANT DISEASE OF THE LIVER is, therefore, justified. Sarcoma of the suprarenal capsule is much more common than carcinoma. The chances are, therefore, that the disease of the liver in this instance is sarcoma. The fact that his mother had a carcinoma is in all probability merely a coincidence.

Prognosis. The prognosis is, humanly speaking, absolutely hopeless. He will probably not live but a few weeks.

Treatment. It will be well to try the mixed toxins of the streptococcus of erysipelas and the bacillus prodigiosus, recommended by Coley. Little or nothing can be hoped from them, however, in this instance.

SECTION X.

DISEASES OF THE KIDNEYS AND BLADDER.

CASE 135. Walter B., fourteen years old, had had measles, whooping cough, chicken-pox, influenza and tonsillitis, but not scarlet fever, diphtheria or rheumatism. His urine had been examined from time to time in the past, but had never contained albumin. He had an acute attack of appendicitis the latter part of December, 1909, which required operation and drainage. He had been below par for some time before this operation and had not been well since then, although he had had no very definite symptoms. He was easily tired, did not feel able to go to school and did not care to play. His appetite and digestion were good. He had no cough or fever. His chief complaint was of pain in the left iliac fossa, which was not dependent on either food or exertion. Micturition was at times a little painful, but was not increased in frequency. He thought that he did not pass any more urine than normal, and did not have to get up at night. He had always been thin and had lost some weight since the operation. He was seen at 2 P.M., May 27, 1910.

Physical Examination. He was thin and rather flabby, but not pale. He looked pulled down and was very nervous. His tongue was clean. His heart was normal except that at times the rhythm was a little irregular. The lungs were normal. The liver and spleen were not palpable. The abdomen was sunken and showed nothing whatever abnormal except the scar of the operation. The kidneys were not palpable. The genitals were normal. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was no edema and no enlargement of the peripheral lymph nodes.

The freshly passed urine was normal in color, clear, alkaline in reaction, of a specific gravity of 1,025, and showed a trace of albumin with nitric acid. The centrifugalized sedi-

ment showed a few small, round cells and no bacteria. The gravity sediment showed neither cells, casts nor blood.

Diagnosis. It is evident, in the first place, that the pain in the abdomen has no connection with the albumin in the urine. It is almost certainly due to adhesions formed at the time of the appendicitis. A bacterial infection of the urinary tract can be excluded on the absence of bacteria and pus corpuscles in the urine. The other possibilities are chronic nephritis and orthostatic albuminuria. His age and the fact that he does not get up at night to pass water are much against chronic interstitial nephritis. He has not had scarlet fever or diphtheria, the usual precursors of chronic parenchymatous nephritis at this age, and has never at any time had any symptoms of acute nephritis. The absence of all organic elements in the sediment, moreover, while possible in chronic interstitial nephritis, is very unusual; it practically excludes chronic parenchymatous nephritis. The high specific gravity is against chronic interstitial nephritis; the small amount of urine against chronic parenchymatous nephritis. The normal condition of the urine at various examinations in the past is also very much against the existence of any form of chronic nephritis. His age and slight build are in favor of orthostatic albuminuria. So also is the impaired muscular tone resulting from his enfeebled condition after the operation, which predisposes him to lordosis, the probable cause of orthostatic albuminuria. Although the diagnosis of orthostatic albuminuria seems reasonably certain, it will be wise to examine the urine further in order to settle the diagnosis. The albumin in orthostatic albuminuria is present only in the urine excreted when the patient is in the upright position. It is usually constantly present in interstitial nephritis or, if not, there is no regularity about its appearance. More urine is passed during the day than during the night in orthostatic albuminuria, while the reverse is the case in chronic interstitial nephritis. The total amount of the urine is unchanged in orthostatic albuminuria, while it is increased in interstitial nephritis.

The twenty-four-hour amount of urine was thirty-one ounces. Twelve ounces were passed during the night and

nineteen ounces during the day. The urine passed on getting up in the morning was pale, clear, acid in reaction, of a specific gravity of 1,030, and showed no albumin by either the heat or nitric acid tests. That passed during the morning was pale, clear, acid in reaction, of a specific gravity of 1,032 and showed a trace of albumin by the nitric acid test. That passed during the afternoon was pale, clear, acid in reaction, of a specific gravity of 1,030, and showed a slight trace of albumin by the nitric acid test. No cells or casts were found in the gravity sediment of any of the specimens. The diagnosis of ORTHOSTATIC ALBUMINURIA is thus confirmed.

Prognosis. The prognosis of this condition is good. It probably never leads to chronic nephritis. The duration is indefinite. It will probably persist in this instance until he gets back into good physical condition and grows heavier and more muscular.

Treatment. There is no specific treatment. The treatment consists in regulation of his life with the object of getting him into good general condition as soon as possible. It is not necessary to diminish the proteids in his diet. It will, however, be advisable for him to lie down for a time daily.

CASE 136. Harry D., eleven years old, had had frequent attacks of recurrent vomiting since he was a baby. He had had an attack of infantile paralysis, involving both legs and one arm, two months before. Nausea and vomiting began November 21 and continued in spite of several doses of calomel, which resulted in a number of large, well-digested movements. He had taken and retained very little nourishment, and had, in consequence, lost considerable weight and strength. He had had no fever. The urine passed during the day of the 26th was clear but small in amount. That night he had considerable pain in the abdomen, especially on the left side. It was not very severe and not paroxysmal. It did not run down into the penis, and micturition was not frequent or painful. The urine passed during the night was not diminished in amount but was distinctly bloody. He was rather lame the morning of the 27th, but had no pain. The urine continued to be bloody. His bowels moved well, but he continued to vomit. His mouth temperature rose to 101° F. He was seen in consultation at noon, November 27.

Physical Examination. He was fairly developed and nourished and a little pale. His tongue was dry and covered with a thin, brown coat. The cardiac area was normal, the sounds fairly strong, the action regular, the rate 120. The lungs were normal. The liver and spleen were not palpable or enlarged to percussion. The abdomen was much sunken. There was slight tenderness on deep pressure in the left flank, but no muscular spasm, dullness or tumor. The kidneys were not palpable and there was no tenderness over the ureters. The genitals were normal. The extremities were not examined.

The urine was red, strongly acid in reaction, of a specific gravity of 1,020 and contained a trace of albumin, considerable acetone and a little diacetic acid, but no sugar. The sediment was very abundant and was almost entirely composed of acid sodium urate crystals. It also contained a moderate number of normal red blood corpuscles and an occasional leucocyte, but no other cells or casts.

Diagnosis. He undoubtedly has one of his ordinary attacks of recurrent vomiting. The disturbance of metabolism at the bottom of the attack, the insufficient supply of food, or both

together, explain the presence of acetone and diacetic acid in the urine. The pain in the abdomen and the hematuria require further explanation. The condition is an acute one, and the examination of the kidneys shows nothing abnormal. It is unnecessary, therefore, to consider such conditions as sarcoma or tuberculosis of the kidney. Acute nephritis is seldom accompanied by pain. It can be excluded on the absence of cells and casts. The most probable explanation would, at first thought, seem to be a renal calculus. The pain was, however, not localized or paroxysmal and did not run down into the penis. Micturition was not painful or increased in frequency. These facts do not, of course, rule out a renal calculus, but make it less probable than at first appeared. A large number of sharp crystals in the urine might easily irritate the kidney sufficiently to cause the sort of pain present in this instance and hematuria. It is hard to conceive of anything sharper than the crystals of acid sodium urate which were so numerous in this boy's urine. Irritation of the kidneys and urinary tract from crystals of acid sodium urate is, therefore, the most reasonable explanation of the HEMATURIA. The disturbance of metabolism at the root of the recurrent vomiting, together with that due to an insufficient supply of food, and the concentration of the urine resulting from an insufficient supply of water, account satisfactorily for the formation of the acid sodium urate crystals.

Prognosis. The prognosis is good. The attack of recurrent vomiting will yield quickly to treatment. The hematuria will cease with relief of the attack of vomiting, and probably sooner if more water can be introduced into the system.

Treatment. See Case 27 for the treatment of recurrent vomiting. The indications for the treatment of the hematuria are to increase the amount of the urine and diminish its acidity. These can best be met by high injections of from eight to twelve ounces of a solution of one teaspoonful of bicarbonate of soda in eight ounces of water every four hours. The same solution may be given by mouth, in teaspoonful or tablespoonful doses, every fifteen or twenty minutes. Fortunately, this method of treatment is also the one most useful in recurrent vomiting.

CASE 137. Frances S., two and one-half years old, was the child of healthy parents. Three other children were living and well; none had died, but there had been two miscarriages. There was no history of tuberculosis in the family and there had been no known exposure to it.

She had always been well and strong. She had a cough for a few days about the 10th of August. Her parents noticed at this time that her eyelids were a little swollen in the morning. Not much was thought of it, however, as the swelling was gone by noon. It became more marked about a week later and had persisted. Swelling of the legs and abdomen also appeared in a few days and had steadily increased. It was noticed at this time that she was not passing as much urine as usual. She was put on an exclusively milk diet, which she took well. Her bowels had been kept well open by cathartics. She was admitted to the Children's Hospital, September 7.

Physical Examination. She was markedly pale, but did not appear very sick. There was marked general anasarca. Her eyelids were so much swollen that it was difficult to see her eyeballs. The pupils were equal and reacted to light. Her tongue was considerably coated. Her teeth were in bad condition and there was a slight pyorrhea alveolaris. The tonsils were ragged and injected. There was a venous hum in the neck. The cardiac impulse was neither visible nor palpable, probably because of the anasarca. The upper border of the relative cardiac dullness was in the second space, the right border $2\frac{1}{2}$ cm. to the right, and the left border 5 cm. to the left of the median line. The first sound was of good strength and was followed at the mitral area by a soft murmur, which was not transmitted. The second pulmonic sound was not accentuated. There was slight dullness, with diminished vesicular respiration and numerous fine, moist râles, below the sixth rib and extending outward to the mid-axillary line on both sides. The upper border of the liver flatness was in the fifth space in the nipple line; the edge was not palpable. The spleen was not palpable. The abdomen was much and symmetrically distended. The superficial veins were not enlarged. The percussion note was flat over the whole ab-

domen except in the epigastrium, where it was tympanitic. The upper border of the flat area was concave. The area of flatness changed with change of position, and there was a fluid wave. There was no spasm or paralysis of the extremities. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was no eruption or desquamation. The rectal temperature was 100° F., the pulse 110, the respiration 30.

Four ounces of urine were passed in the first twenty-four hours of her stay in the hospital. It was brownish in color, turbid, acid, of a specific gravity of 1,030 and contained twenty grams of albumin per liter, but no sugar or acetone. The sediment showed large numbers of hyaline, fine and coarse granular casts, and a few blood casts, as well as large numbers of red and white blood cells.

Diagnosis. She undoubtedly has ACUTE NEPHRITIS. The normal size of the heart and the absence of accentuation of the second aortic sound prove that there is no chronic trouble back of it. The etiology is obscure. The ragged, injected tonsils or the diseased teeth and gums may have been the portal of entry for the infection. The venous hum in the neck and the murmur in the heart are anemic in origin and unimportant.

Prognosis. The prognosis is grave. She is passing but little urine and has general anasarca, ascites and edema of the lungs. A more definite prognosis can be given in a few days after it has been seen how well she responds to treatment. If she responds quickly, she will probably recover entirely in time. If she does not respond, she will probably not live many days.

Treatment. Her kidneys are congested and engorged with blood, the glomeruli and tubules are blocked and the epithelium degenerated. They are able to excrete but little and are practically impervious to water. If they were not, she would not be edematous. Water must, therefore, be stopped entirely for the present. It ought not to be given again until the kidneys have begun to excrete fairly freely and the edema and ascites are diminishing.

Her kidneys should be spared the work of excretion as

much as possible. The products of the metabolism of certain foods are excreted with difficulty, and those of others easily. Those substances which are excreted with the most difficulty are urea, creatinin and phosphoric acid. Urea is derived from proteids: meat, eggs and milk. It would seem wise, then, to cut out all proteids from her diet. Nothing is gained, however, by reducing them below a certain point, because, even in starvation, a certain amount of urea is formed as the result of the destruction of the body tissues. If enough proteid is given to cover this nitrogenous waste, the body tissues are saved and the kidneys are not worked any harder than when no proteid is given. The amount of proteid required to balance the necessary nitrogenous metabolism of the body is known as the minimum proteid need, and is, in a child of this age, about twenty grams. Creatinin is derived from creatin. This is contained in meat and especially in meat extracts and meat broths. Meat extracts and broths contain little else and have but little nutritive value. They should, therefore, be entirely excluded from her diet. Milk contains but little creatinin. Phosphoric acid is present in large amounts in meats, yolk of egg, milk and many vegetables. The addition of calcium carbonate to the food, however, prevents its passage through the kidneys and causes it to be excreted by the intestines. The products of the metabolism of fat, sugars and starches are excreted by the kidneys without much difficulty.

It is not only necessary, however, to cover her proteid need, but also to cover her caloric needs. These are a little under 1,000 calories. She can get along very well for a time, however, on 800 or 900 calories.

The problem is, then, to lay out a diet for her which will contain 800 or 900 calories and about 20 grams of proteid. The best form in which to give the proteid is milk. Six hundred cubic centimeters of milk will give 21 grams of proteid, but only about 400 calories. If milk enough is given to furnish 900 calories it will contain 47 grams of proteid, which is more than double the minimum proteid need. The disadvantages of an exclusively milk diet are thus evident. If 200 ccm. of gravity cream (16% fat) is substituted for 200

ccm. of milk, the mixture will provide 600 calories. The remainder of the caloric need can be met by giving sugar and starch. For example, as is shown in the following table of food values, two tablespoonfuls of cereal will give 50 calories, two teaspoonfuls of sugar 50 calories, one slice of bread 75 calories, and a piece of butter one inch square and one-half inch thick, about 65 calories, making a total of 840 calories, which covers fairly satisfactorily her caloric needs, and does not add much to the proteids.

TABLE OF FOOD VALUES.

	Calories.	Grams. F.	C.	P.
Whole milk, 1 quart,	670	38	43	34
Skim milk, 1 quart,	400	10	43	35
Gravity cream, 1 pint,	860	77	22	14
Buttermilk, 1 quart,	360	5	43	35
Whey, 1 quart,	260	5	43	9
Beef juice, 1 ounce,	10			2
Crackers, 1 ounce,[1]	120	3	20	3
Bread, 1 slice,[3]	75	0.5	15	3
Zwiebach, 1 slice,[4]	120	3	20	3
Shredded wheat biscuit,	105	0.5	22	3
Oatmeal and other cereals (cooked), 1 tablespoonful,	25		5.5	1
Rice (cooked), 1 tablespoonful,	45		10	1
Potato, size of large egg,	100		20	2
Macaroni (cooked), 1 tablespoonful,	30	0.5	5	1
Egg { Whole,	72	5		7
Egg { Yolk,	60	5		4
Egg { White,	12			3
Meat / Fish (cooked), 1 ounce,[2]	60	3		7
Butter, 1¼ inches cube = 1 ounce,	225	24		
Olive oil, 1 tablespoonful,	125	14		
Sugar { Cane, 1 rounded teaspoonful,	25		6	
Sugar { Milk, 1 rounded tablespoonful,	60		15	
Green peas (cooked), 1 tablespoonful,	40		7	3
Carrots / Squash / Turnip (cooked), 1 tablespoonful,	30		6	1
Orange, medium sized,	50		13	
Apple, medium sized,	70		17	

[1] Crackers vary so much in size that they must be weighed to determine how many it takes to weigh an ounce.
[2] The lean of a lamb chop weighs about an ounce; so does a piece of meat about 1¼ inches cube.
[3] Bread, one slice = four inches square and three-eighths inch thick = 1 ounce.
[4] Zwiebach, one slice = large slice.
Clear soups and broths made without rice or barley have practically no nutritive value.
The nutritive value of the "fodder" vegetables, such as spinach, string beans, asparagus, lettuce, tomatoes and cucumbers, is so slight that it may be disregarded.

The addition of 30 grains of prepared chalk to the milk and cream mixture will probably render the phosphoric acid practically inert. The chief objection to the milk in this instance

is the water which it contains, a little more than a pint. In her present condition even this amount of water may do harm. It will be wise, therefore, to disregard her proteid needs for twenty-four or forty-eight hours and give her nothing but carbohydrates and fat. In fact, it will do her no harm if she takes no nourishment at all for twenty-four or forty-eight hours.

There are no drugs which can directly aid her kidneys to do their work. Digitalis and drugs of its class have no direct action on the kidneys, but increase the flow of urine by strengthening the action of the heart and thus sending more blood through the kidneys. Her kidneys are already engorged with blood. It is, therefore, not only irrational to increase the flow of blood to her kidneys, but also very likely to increase the trouble. Caffein, theobromin and their preparations have a direct stimulant action on the renal epithelium. Her renal epithelium is in no condition to respond to stimulation and, moreover, stimulation may do harm by increasing the inflammation. The action of alkalies is probably the same as that of other diffusible bodies which are excreted by the kidneys and which during their excretion increase the flow of urine. As the object of the treatment is to spare the kidneys, it hardly seems rational to give alkalies at this time to increase the work which they have to do. All drug treatment is, therefore, contra-indicated.

It is possible, however, to spare the kidneys by making the bowels do part of their work. She must, therefore, be made to have three or four large, watery movements of the bowels daily. Compound jalap powder, in doses of fifteen grains, or compound licorice powder, in doses of from one to two teaspoonfuls, will probably do this best in this instance, as she will probably not object to them as she would to concentrated solutions of Epsom salts, the ideal cathartic in this condition. The free catharsis will also help to diminish the edema.

It is important to get rid of the edema. The best way to accomplish this is by free diaphoresis. This spares the kidneys by getting the water out of the system, but does not save them in other ways, because it is certain that but little urea is eliminated in this way, and there is no proof that toxic

substances are excreted by the skin. Pilocarpin is the only diaphoretic drug powerful enough to be of any practical utility. It is, however, a very dangerous drug on account of its liability to cause edema of the lungs, and should never be used except in an emergency. Her condition is not serious enough to justify its use. The application of heat externally is far safer and usually more effectual. It is very difficult to keep a child in a hot-air bath long enough to get good results, as they soon become restless and kick the coverings loose. They object much less to hot packs. She should be wrapped in a blanket and put in a tub of water between 105° F. and 110° F. and kept there from ten to fifteen minutes. She should then be taken out, wrapped in a hot, dry blanket and kept surrounded by heaters for from one-half to two hours. This should be repeated daily as long as there is much edema.

CASE 138. Nora C., aged thirteen months, lived in a town in which malaria was common. She was breast-fed for five months. She was then weaned gradually and put on a "hit-or-miss" mixture of top milk with Mellin's Food, on which she did very well. Early in August, about three weeks before she was seen, she began to be feverish and was given calomel. The next day she was better, but two days later she had a chill. She had had no chills since then, but had sweat profusely at times and had lost much weight. Her temperature had not been normal but once in the last two weeks, and had been very irregular. The food had been changed to a weak top milk and barley water mixture. She had not vomited, but had been constipated. The movements, however, were normal in character. The Widal reaction, tested three days before, was negative. The diagnosis of malaria having been made, on the basis of the irregular temperature, the chill, the sweating and the negative Widal test, she had been given quinine in considerable doses during the last six days without, however, any improvement in the symptoms.

Physical Examination. She was well developed and nourished, but a little pale and flabby. The anterior fontanelle was 3 cm. in diameter and level. She was irritable, but not stupid. Her mouth and throat showed nothing abnormal. She had eight teeth. There was no rosary. The heart, lungs and abdomen showed nothing abnormal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

The blood showed 80% of hemoglobin, and 37,600 white corpuscles.

Diagnosis. The negative Widal test and the leucocytosis rule out typhoid fever. The absence of enlargement of the spleen and the leucocytosis, as well as the failure of the quinine to influence the symptoms, exclude malaria. The fever, chills, sweating and leucocytosis point to a purulent process somewhere. There is nothing about the symptomatology to suggest the location of this process. In such instances the middle

ear and the urine must always be investigated, since in infancy both otitis media and pyelitis often cause marked general, without any local, symptoms. If the trouble is not found in one, it is almost certain to be found in the other. If both are normal, the trouble is most often tubercular.

The ears were examined and found normal.

The fresh urine was cloudy, pale, neutral in reaction and contained a very slight trace of albumin. The sediment obtained by centrifugalization showed very many pus cells, free and in clumps, a few small round, squamous, oval and caudate cells, and many motile bacteria. These bacteria were later shown to be colon bacilli.

The diagnosis is, therefore, PYELITIS, or, better, infection of the urinary tract by the bacillus coli.

Prognosis. There is practically no danger as to life. She will probably recover in a few weeks, but there is a reasonable probability that the condition will persist, with intermissions, for many months. In some instances the urine continues to contain bacteria, and at times pus, for years, although there is no constitutional disturbance. There is very little danger that the process will extend to the kidney tissue or that it will involve anything more than the superficial layers of the pelvis and bladder.

Treatment. Local treatment of the bladder is of comparatively little value because the infection is not localized in the bladder but involves the whole urinary tract. It is better, therefore, not to use it in this instance. Hexamethylenamin, the best drug of its class, liberates formaldehyde readily in the urine and has a strong antiseptic action. Unfortunately the colon bacillus is comparatively insusceptible to its action. Hexamethylenamin is usually less effective than the alkalies, which, in spite of the fact that the colon bacillus grows more luxuriantly in alkaline than in acid media, are often very useful. It will be well, therefore, to give her ten grains of the citrate of potash, well diluted, three times a day. If this dose is not sufficient to make the urine highly alkaline, larger doses must be given. If the urine does not clear up under this treatment, hexamethylenamin, in doses of from one-half grain to one grain, three times a day, should be tried. If the trouble

still persists, it will be well to try the effect of suddenly changing the reaction of the urine every three of four days, which sometimes clears up the urine very quickly. It can be made alkaline with the citrate of potash and acid with benzoic acid, in doses of from one to three grains, three times a day.

If the trouble still continues, the vaccine treatment may be tried, but too much must not be hoped from it. In some instances it works very well; in others it has no effect whatever. An autogenous vaccine must be used. It will be well to begin with 25,000,000 every three or four days, increasing the dose rather rapidly to 100,000,000. The treatment can be carried on satisfactorily without determinations of the opsonic index.

CASE 139. Mary W., aged seven months, was taken suddenly sick with high fever the night of July 7. No cause for the fever could be made out. The temperature ran between 103° F. and 105° F. up to the time she was seen in consultation, July 14. The physical examination had always been negative. She had had a slight cough in the beginning. She had taken her food poorly, but had vomited but once. The bowels had moved regularly and the movements had been normal. She had always been conscious, but during the last two days had seemed tender all over and had held her head backward. During the last two or three days micturition had been painful but not increased in frequency, and the urine had left greenish-yellow spots on the diapers.

Physical Examination. She was well developed and nourished, but had evidently lost some weight and color. She was conscious, but irritable. The anterior fontanelle was 3 cm. in diameter and depressed. There was no rigidity or tenderness of the neck and no neck sign. The pupils were equal and reacted to light. The ear-drums were normal. The tongue was dry, the throat and gums normal. There were four teeth. The heart, lungs and abdomen were normal. The liver was just palpable in the nipple line. The spleen and kidneys were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent and there was no contralateral reflex. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 103.6° F., the pulse 160, the respiration 40.

A stool which was seen was loose, smooth, yellow and contained no curds or mucus. There were several small spots, looking like pus, on the diaper.

Diagnosis. The most probable diseases in this instance are pneumonia, cerebrospinal meningitis and pyelitis. The sudden onset, the continued high fever and the slight cough suggest pneumonia, but the absence of physical signs after a week and the fact that the rate of the respiration is not increased out of proportion to that of the pulse make it extremely improbable. Meningitis is suggested by the history of general tenderness and of the tendency to hold the head

backward. It can be ruled out at once, however, on the depressed fontanelle and the absence of all signs of meningeal irritation or increased cerebral pressure. A lumbar puncture was done, however, at the request of the attending physician. The fluid ran out slowly, drop by drop, was perfectly clear, did not form a fibrin clot and contained no cells or bacteria (for description of the cerebrospinal fluid in health and disease see Case 72), thus proving that the trouble was not meningitis.

The continued high fever without physical signs and with normal ears suggests at once the possibility of pyelitis. The painful micturition and the greenish-yellow spots on the diapers make this diagnosis almost certain. The urine was, therefore, obtained with a catheter. It was pale, turbid, acid in reaction and contained many pus cells and motile bacteria, which were later proved to be colon bacilli. The results of this examination confirm, of course, the diagnosis of PYELITIS.

Prognosis. See Case 138.

Treatment. See Case 138.

CASE 140. Catherine R. was the fourth child of healthy parents. There had been no deaths or miscarriages. She had not, as far as known, been exposed to tuberculosis.

She was born at full term after a normal labor and was normal at birth. She was breast-fed, but was given in addition bread, potatoes and, in fact, a taste of almost everything on the table. Her digestion was good in spite of her faulty diet, and she gained steadily in weight up to an attack of bronchitis, when she was nine months old. She did not seem as well after the bronchitis and ceased to gain, although her appetite and digestion continued good. Enlargement of the abdomen was noticed when she was nine and a half months old, and had increased rapidly since then. The abdomen had not been tender and the urine had never been red. She was seen in consultation when ten months old.

Physical Examination. She was fairly developed and nourished. Her skin was pale, but her lips were red. The anterior fontanelle was 2 cm. in diameter and level. She had four teeth. Her tongue was clean and her throat normal. There was no rosary. Her heart and lungs were normal. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The left half of the abdomen was nearly filled by a hard, smooth, rounded mass. It had no definite borders, was flat on percussion and not at all tender. It filled the flank and evidently originated deep in the abdomen. It was not movable and its position was not influenced by the respiration. The abdomen showed nothing else abnormal. The extremities were normal and there was no edema. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The mass could be felt on rectal examination.

Stained smears of the blood showed no changes in the red corpuscles and no leucocytosis. A large majority of the white corpuscles were lymphocytes, although there was a slight excess of eosinophiles.

Diagnosis. The location of the mass deep down in the flank and its rounded character, without definite borders, prove that it is not a tumor of the spleen. The tumors in

caseous or fibrocaseous tubercular peritonitis are not as large, are irregular in outline and usually multiple. Enlargement of the retroperitoneal lymph nodes might cause a tumor in this region, but it would not be as large and would be irregular in outline. The only organ whose enlargement would cause a tumor in this location is the left kidney. This tumor must, therefore, be the left kidney. The possible causes of enlargement of the kidney are hydronephrosis, pyonephrosis and sarcoma. Hydronephrosis is extremely rare at this age, she has had no attacks of pain and there is no fluctuation. Pyonephrosis is also extremely uncommon at this age, there is nothing in her history to suggest an infection of the urinary tract, she has no fever or leucocytosis, her general condition is good and there is no fluctuation. Sarcoma of the kidney is more common at this age than at any other, it develops insidiously without much disturbance of the nutrition, and the tumor in this instance corresponds in its physical characteristics to those of sarcoma of the kidney. The eosinophilia is also suggestive of a new growth. The absence of hematuria does not count against sarcoma, because it occurs in but a small proportion of the cases. The diagnosis of SARCOMA OF THE KIDNEY is, therefore, justified.

Prognosis. The prognosis without operation is absolutely hopeless. She will probably not live more than three or four months. It is not much better with operation. The operation is a serious one and often fatal. Recurrence takes place in the neighboring tissues in the large majority of those that survive the operation. A few recover.

Treatment. The only treatment is the immediate removal of the tumor.

CASE 141. Frank N. was the only child of healthy parents. He had had much trouble with his digestion between his fourth and ninth years and had always been subject to bronchitis. He had measles at two years and broke his arm when five years old. When ten and one-half years old he had pneumonia, followed by empyema. The sinus did not close for six months. He was very much pulled down by this illness and did not regain his strength until six months later. Puffiness of the eyelids had been noticed from time to time ever since the closing of the sinus, but no attention was paid to it until six months later, when swelling of the feet also appeared. At this time he was often unable to put on his shoes in the morning and hardly able to open his eyes during the early part of the day. His physician, who was then called, found that he was passing about one quart of urine daily, which was acid in reaction, of a specific gravity of 1016 and contained one-eighth per cent of albumin. The sediment was not examined. He cut meat and eggs out of the boy's diet and advised the ingestion of large amounts of water. Under this treatment the edema diminished, but the urine continued to contain albumin. During this time he had no headache, dizziness, nausea or vomiting and appeared well except for the edema of the eyelids. The swelling of the feet had returned about a month before he was seen, when twelve years old, but had disappeared again during the last week, which he had spent in bed on account of an attack of acute bronchitis.

Physical Examination. He was fairly developed and nourished and very pale. His face was generally puffy and the eyelids were so much swollen that it was difficult for him to open them wide enough to see. The tongue was moist and considerably coated. The throat was normal. The cardiac impulse was in the fifth space, nine cm. to the left of the median line. The left border of dullness corresponded with the impulse. The right border was three cm. to the right of the median line and the upper border at the third rib. The action was regular, the sounds were strong and there were no murmurs. The second sounds at the pulmonic and aortic areas were of the same intensity. There was a venous hum

in the neck. The tension in the radial arteries was not perceptibly increased. The scar of the old operation for empyema was in the lower right axilla. The lungs were normal, except that there were many sibilant and sonorous râles on both sides, both in front and behind. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line; the lower border was not palpable. The spleen was not palpable. There was slight dullness in the flanks, which did not change with change of position. There was no fluid wave. The abdomen was otherwise normal. There was no edema of the extremities or of the external genitals. There was no enlargement of the peripheral lymph nodes.

The twenty-four hours amount of urine was thirty-four ounces. It was of normal color, acid in reaction, of a specific gravity of 1016 and contained at least two per cent of albumin. The centrifugalized sediment contained very many casts, hyaline, fine granular, coarse granular, epithelial, fatty and waxy. It also contained a moderate number of leucocytes and small round cells, a few normal and abnormal red blood corpuscles, an occasional compound granule cell and much free fat.

Diagnosis. The BRONCHITIS is merely an incidental complication. The examination of the urine shows that he has nephritis. The duration of the edema, the enlargement of the heart and the increase in the intensity of the second sound at the aortic area show that it is chronic. The appearance of the symptoms coincident with the long-continued discharge of pus from the chest suggests that amyloid disease of the kidneys is the cause of the trouble. The absence of enlargement of the liver and spleen and the large amount of albumin and fat in the urine show, however, that this is not the case. The age of the child, the edema, the absence of an increase in the amount of urine, the large amount of albumin and the character of the sediment rule out chronic interstitial nephritis. The diagnosis is, therefore, by exclusion, CHRONIC PARENCHYMATOUS NEPHRITIS. The history, the absence of an increase in the amount of urine, the large amount of albumin and the presence of waxy casts and fat in the sedi-

ment are, moreover, characteristic of this condition. The red blood corpuscles in the sediment show that there is also an acute exacerbation of the process.

Prognosis. The prognosis is hopeless. He will almost certainly not live more than a year, probably not but a few months.

Treatment. The principles of the treatment of acute nephritis are described in Case 137. This being a hopeless condition, it will not be necessary to limit his diet as closely as in the acute form. There is no objection to giving him a part of his proteids in the form of meat and eggs, although it will be wise to exclude broths. There is not sufficient edema to call for the application of heat externally, but it will be well to keep his bowels freely open. It is not advisable, in spite of the edema, to cut down his liquids enough to make him uncomfortable. They should be limited, however, to this extent. He ought to stay in bed until over the bronchitis. There is no reason why he should not then be up and about, but he should avoid exposure and fatigue. That is, his life and treatment should be regulated so as to make him live as long as possible, but his routine should not be so rigorous as to make his last days miserable. The treatment of this type of bronchitis is described in Case 104.

CASE 142. Richard P., five and one-half years old, was the first child of healthy, normal parents. He had always been well. He had never ceased to wet the bed, although he had not wet his trousers since he was old enough to wear them. He usually wet the bed soon after going to sleep and again in the early morning. He slept very heavily. Removal of his adenoids and circumcision had not diminished the frequency of the wetting. He had had no other treatment, except that the ingestion of liquids had been somewhat limited during the latter part of the day. His appetite and digestion were good and his bowels moved regularly. No pin-worms had ever been seen. He was not especially nervous.

Physical Examination. He was well developed and nourished and of good color. He seemed of normal intelligence and did not appear at all neurotic. His tongue was clean, his teeth good and his throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. There was no irritation of the penis and no irritation about the anus. The extremities were normal. There was no spasm or paralysis. The knee-jerks, cremasteric and abdominal reflexes were normal. There was no enlargement of the peripheral lymph nodes.

The urine was of normal color, clear, highly acid in reaction, of a specific gravity of 1030, and contained neither albumin nor sugar.

Diagnosis. The diagnosis is, of course, NOCTURNAL ENURESIS. It is, moreover, undoubtedly, not organic in origin, but of the so-called "functional" or "essential" type. There are no evidences of inflammation or irritation of the rectum, penis, urethra or bladder. The only possible reflex cause is, then, the highly acid and concentrated urine. It is probable, however, that this is merely a temporary condition and not the real cause of the trouble. Neither he nor his parents are neurotic, his general condition is good and he is not anemic. Increased irritability of the spinal centres cannot, therefore, be the cause. It must be, then, interference with the normal cerebral control of the spinal centres. This interference cannot be due to adenoids, as they have been removed. It is, in all probability, the result of a combination of somewhat

tardy development of the cerebral centres and the depressing influence of very deep sleep on their action.

Prognosis. He is certain to get over it, because as time goes on the cerebral centres will develop and be able to control the spinal centres, even during deep sleep. It is impossible to know how long it will be before this happens, probably, however, not under a year. Careful treatment will presumably relieve the condition to a certain extent and perhaps hasten recovery.

Treatment. He cannot help wetting the bed when he is asleep. Not being responsible for the condition, he ought not, therefore, to be punished for it. Appeals to his pride or rewards may be of some assistance, but probably will not. He should be given water freely, to diminish the concentration of the urine, and citrate of potash in doses large enough to make the reaction neutral or slightly alkaline. Fifteen grains, three or four times daily, will probably be sufficient to do this. The water must all be given, however, before 4 P.M., because, if given later than this, it will increase the tendency to wet the bed by filling up the bladder. He should, for the same reason, have as dry a supper as possible. He should pass water just before going to bed and should be waked up early in the evening to pass it again. He should also be made to pass it when his parents go to bed and as soon as he begins to wake up in the morning. He should sleep on a hard bed. His coverings must be carefully regulated. If he is too warm, he will sleep more soundly and be more likely to wet, while, if he is cold, he will secrete more urine, which will also cause him to wet the bed. It will be well to raise the foot of the bed about six inches, as this tends to take the pressure of the urine off of the sensitive neck of the bladder. Belladonna is indicated in this instance, because of its action in diminishing reflex excitability. He should be given five drops of the tincture of belladonna after supper. The dose should be increased one drop each night until toxic symptoms appear. It should then be diminished two drops, and kept at this point for some months. He is in good condition and shows no signs of nervous irritability. Tonics and nerve stimulants, such as strychnia, are, therefore, not indicated.

SECTION XI.

DISEASES OF THE BLOOD.

CASE 143. Mary J. was seen when twenty-three months old. Her mother had died soon after her birth of a cancer which she had had during the pregnancy. She had always been fed exclusively on modified milk. She had had no illnesses except several slight digestive upsets when about a year old. She took her food well and did not vomit, although at times she seemed nauseated. Her bowels moved regularly and the movements were normal. She was listless and quiet and her temperature was usually a little subnormal.

Physical Examination. She was well developed and nourished, but moderately pale. The anterior fontanelle was closed and her head was of good shape. She had twelve teeth. Her tongue was clean and her mouth and throat normal. There was a venous hum in the neck. The heart was normal except for a systolic murmur at the pulmonic area, which was not transmitted. The lungs were normal. There was a slight rosary. The level of the abdomen was that of the thorax. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

The urine was pale, clear, faintly acid in reaction, of a specific gravity of 1,012, and contained neither albumin nor sugar. The sediment showed nothing abnormal.

BLOOD.

Hemoglobin,	50% (normal = 70%)	
Red corpuscles,	5,122,000 (normal = 5,500,000 to 6,000,000)	
White corpuscles,	11,300 (normal = 10,000 to 12,000)	
Mononuclears,	31%	(normal)
Polynuclear neutrophiles,	65%	
Eosinophiles,	1%	
Mast cells,	3%	

The red corpuscles showed some variation in size and shape and some achromia, but no nucleated forms.

Diagnosis. The venous hum in the neck and the systolic murmur at the pulmonic area are, of course, merely signs of the very evident anemia. The percentage of hemoglobin is about seventy per cent of the normal, while the number of red corpuscles is about ninety per cent of the normal. The morphological changes in the red corpuscles are so slight that they are of but little importance. The blood picture is, therefore, that of chlorosis. The diagnosis of chlorosis is for many reasons, however, not justified in this instance, in spite of the characteristic blood picture.

In the first place, the percentage of hemoglobin is always relatively low in infancy. This is presumably due to the fact that the infant normally receives an insufficient supply of iron in its food and that the reserve of iron present in the liver at birth is not large enough to keep the percentage of hemoglobin at the adult standard. The reserve of iron is, moreover, often insufficient, and in any event is comparatively easily exhausted. It is seldom sufficient to outlast the first year. This relative disproportion between the hemoglobin and the number of red corpuscles, when compared with the adult standard, is almost always exaggerated in the blood diseases of infancy.

This infant was, on account of her mother's illness during the pregnancy, probably born with an insufficient reserve of iron. She has never had any food but milk, which does not contain enough iron to meet the needs of the normal infant's system. Her reserve, being insufficient, was undoubtedly exhausted long before the end of the first year, so that for a year or more she has been unable to make up for the lack of iron in her food and has been falling more and more behind. That is, the causes which make the hemoglobin low under normal conditions in infancy are much exaggerated in her case. The diagnosis of chlorosis is, therefore, not justified in this instance. The real condition is a SECONDARY ANEMIA, due to the long-continued exclusive milk diet.

Further evidence against the diagnosis of chlorosis in these cases is that they occur indifferently in boys and girls, and

that they have no pathologic connection with the nervous or genital systems.

Prognosis. The addition of other foods to her diet and the administration of iron will improve the condition of the blood very rapidly.

Treatment. Beef juice and egg should be at once added to her diet because of the iron which they contain. Starchy foods should also be added. She is old enough to digest them and needs a more varied diet in order to thrive. The best forms of iron for her are the saccharated carbonate and ferratin. The former may be given in five-grain and the latter in three-grain doses, three times daily, after food.

CASE 144. Alma H., seven months old, was the second child of healthy parents. There was no tuberculosis in the family and there had been no known exposure to tuberculosis. She was born at full term after a normal labor, was normal at birth and weighed ten pounds. She had had nothing but the breast and had always done well. The outside of the house had been painted just before the onset of her illness. Her mother also menstruated for the first time just at the time of the onset. Her parents affirmed that she was perfectly well and had a good color on April 2. Marked pallor was noted the next day. She had had no hemorrhages or other symptoms of illness. The pallor became yellowish on April 6 and the mucous membranes pale on April 7. There had been no increase in the pallor up to April 11, when she was seen. The conjunctivæ had not been yellow, the movements had been dark green in color and the urine had not contained bile. She had had no hemorrhages and had not been tender. She had taken her food well and had not vomited. She had had no fever, but at times had seemed chilly and had had cold and blue extremities, but no sweating. She had become very quiet, but was not fussy.

Physical Examination. She was decidedly apathetic. She was well developed and nourished, but very pale. The skin had a decided yellowish tinge, but the conjunctivæ were clear. The anterior fontanelle was 2 cm. in diameter and level. There was no rigidity of the neck and the head was of good shape. The tongue was clean; the mouth, gums and throat normal. There were no teeth. There was a slight venous hum in the neck. There was no rosary. The heart was normal except for a slight systolic murmur at the pulmonic area, which was not transmitted. The lungs and abdomen were normal. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. There was no tenderness or swelling of the extremities except a little puffiness of the feet. There was also a little puffiness about the eyes. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There were no hemorrhages into the skin and no eruption or scars of old eruptions.

BLOOD.

Hemoglobin,	20% (normal = 70%)
Red corpuscles,	1,492,000 (normal = 5,500,000 to 6,000,000)
White corpuscles,	11,000 (normal = 10,000 to 14,000)
Small mononuclears,	68% (normal = 40% to 50%)
Large mononuclears,	7% (normal = 10%)
Polynuclear neutrophiles,	21% (normal = 35% to 45%)
Eosinophiles,	4% (normal = 1% to 5%)

The red corpuscles showed marked variation in size, the tendency being toward large forms. There was slight poikilocytosis and moderate polychromatophilia, but no stippling. Three normoblasts were seen in counting one hundred white cells. Some of the white cells were very large, looking like large cells from the bone marrow, and were throwing off blood plates. There was a large increase in the number of blood plates. No malarial organisms were seen.

Diagnosis. It is very hard to believe that, in the absence of hemorrhages, the anemia developed as rapidly as the parents affirm. The blood picture is that of a more chronic condition, and it seems probable, therefore, that the parents did not notice the condition until it was fully developed. It is also difficult to believe that the painting of the house or the mother's menstruation had anything to do with its development. The absence of stippling of the red cells is much against lead poisoning. Menstruation sometimes causes disturbances of digestion, but not anemia. It is more probable that the breast milk, while suitable in other ways, was deficient in iron, and that after the reserve supply in the liver was exhausted the anemia developed gradually. Scurvy can be ruled out as a cause on the absence of tenderness and swelling of the extremities and of hemorrhages. Malaria can be excluded on the absence of plasmodia in the blood.

The morphological changes in the red corpuscles, the predominance of the large over the small forms of red cells, the presence of nucleated cells and the large percentage of mononuclear leucocytes would in the adult point strongly toward pernicious anemia. The tendency common to all the anemias of infancy to revert to a younger type of blood and the normal preponderance of mononuclear leucocytes and of

greater variation in their size make these points of practically no importance in the diagnosis of pernicious anemia in infancy. In all probability, moreover, pernicious anemia does not occur at this age. The large number of blood plates present in this instance would exclude it, even in an adult.

Acute lymphatic leukemia in an aleukemic stage is suggested to a certain extent by the changes in the red cells and the comparatively large proportion of mononuclear leucocytes. The absence of enlargement of the spleen and lymph nodes and the age are much against it. The slight significance of the changes in the red cells and of the excess of mononuclear leucocytes has already been explained. The large number of blood plates practically excludes leukemia.

There is nothing about the blood picture which is in any way inconsistent with a secondary anemia in infancy. A diagnosis of SECONDARY ANEMIA is, therefore, justified, a possible cause being a deficiency of iron in the mother's milk.

Prognosis. The condition of the blood will undoubtedly improve rapidly if iron is given.

Treatment. The baby has done so well in every other way on its mother's milk that it is unwise to wean it, since any deficiency of iron in the milk can be very easily remedied by the administration of iron. This may be given by mouth in the form of the saccharated carbonate or of ferratin. When the anemia is as marked as it is in this instance it is better, however, to give it subcutaneously, because the improvement begins so much sooner and is so much more rapid than when it is given in the ordinary way. The best form of iron for subcutaneous use is the aqueous solution of the citrate. This can be put up in pearls and sterilized, and when prepared in this way remains sterile indefinitely. It is not irritating. If given subcutaneously, the injection rarely causes much pain, but, if given intramuscularly, it is often very painful and sometimes causes slight symptoms of shock. It must be given with a glass syringe with asbestos packing and a platinum needle. The syringe and needle must, of course, be sterilized. The dose for this infant is three quarters of a grain, every other day.

CASE 145. Jennie R., the daughter of healthy parents, was one of twins. The other had always been well. Another child was well, while a fourth had died in infancy of "summer complaint." She was nursed for five weeks, after which she was given modified milk, prepared at a laboratory, for three weeks. She had been fed since this time on a modified milk, prepared at home. The mixture, which was a weak one, had not been changed, however, for seven months. During this time she had had no disturbance of digestion, but had gained very slowly. She had a slight attack of diarrhea when nine months old, which yielded quickly to treatment and was followed by constipation. Since then she had taken a stronger modification of milk and had had no disturbance of digestion. She was seen when ten months old because she was not thriving.

Physical Examination. She was fairly developed and nourished. There was moderate pallor of the skin and mucous membranes. The anterior fontanelle was three cm. in diameter and level. The head was flattened on top and behind, but there was no craniotabes. There were two teeth. She sat alone feebly, but with the spine straight. There was a marked rosary. There was slight retraction of the chest at the insertion of the diaphragm. The heart and lungs were normal. The abdomen was distended but otherwise normal, except for a slight umbilical hernia. The upper border of the liver flatness was at the upper border of the fifth rib; the lower border of the liver was palpable three cm. below the costal border in the nipple line. The spleen was felt running out from beneath the costal border in the left anterior axillary line to the right of the umbilicus, then downward and backward to the left anterior superior spine and backward into the loin. The surface was smooth, the consistency firm. The notch was felt distinctly in the left nipple line, midway between the costal border and the navel. The extremities were normal except for a moderate enlargement of the epiphyses at the wrists. There was a slight general enlargement of the peripheral lymph nodes. She weighed ten pounds and two ounces.

The urine was pale, acid, of a specific gravity of 1015 and contained no albumin or sugar.

BLOOD.

Hemoglobin,	40% (normal = 70%)
Red corpuscles,	4,000,000 (normal = 5,500,000 to 6,000,000)
White corpuscles,	18,750 (normal = 10,000 to 12,000)
Small mononuclears,	34.4% (normal = 40% to 50%)
Large mononuclears,	12.6% (normal = 10%)
Polynuclear neutrophiles,	51% (normal = 35% to 45%)
Eosinophiles,	.2% (normal = 1% to 5%)
Myelocytes,	1.8%

The red corpuscles showed marked variation in size, shape and staining reaction. There was no tendency to large forms, but a slight tendency to oval forms. Sixteen normoblasts and nine megaloblasts were seen in counting five hundred white corpuscles.

Diagnosis. The flattening of the head, the rosary, the retraction of the chest at the insertion of the diaphragm and the enlargement of the epiphyses at the wrists are signs of rickets, as is probably the delay in the eruption of the teeth. The general enlargement of the peripheral lymph nodes is merely a manifestation of a disturbance of the nutrition. The pallor and the changes in the blood show that she has an anemia. The presence of myelocytes, megaloblasts and such marked morphological changes in the red corpuscles would suggest, in an adult, pernicious anemia. In an infant, however, they are merely evidences of the tendency of the blood to revert to a younger type. The greater relative diminution in the percentage of hemoglobin than in the number of red corpuscles, 57% against about 70%, is characteristic of secondary anemia in infancy. (See Case 143.) The leucocytosis may or may not be directly connected with the anemia. It is not at all uncommon in secondary anemia in infancy, however, and is of no especial significance. The blood changes are, therefore, entirely consistent with those of secondary anemia.

There is, in addition, a marked enlargement of the spleen. What is the connection, if any, between the rickets, the

anemia and the enlargement of the spleen? Is any one of them the cause of the others, or are they all manifestations of some common cause? It is certain that the anemia and the splenic tumor could not have caused the rickets. Could the rickets have caused the anemia and splenic tumor? While it is conceivable that they might have, the chances are very much against it, because the study of large series of cases shows that there is no connection whatever between the severity of the rickets and that of the anemia and the size of the spleen, many babies showing marked rickets and no anemia, others mild rickets and severe anemia, and so on. In the same way, marked enlargement of the spleen is often found in connection with mild rickets and no enlargement of the spleen in some of the most marked cases. The study of other series of cases shows that there is no connection between the size of the spleen and the changes in the blood, very marked changes being present in the blood when the spleen is not enlarged, very slight when the spleen is much enlarged, and so on. It seems reasonable to conclude, therefore, that the rickets, the anemia and the enlargement of the spleen are all manifestations of some common cause. This cause is not hard to find. It is undoubtedly the disturbance of nutrition due to the prolonged use of too weak a food.

The combination of marked changes in the blood and splenic tumor, as is present in this instance, has often been set aside as a special disease and described under various names, the most common of which is anemia infantum pseudoleukemica. The combination is always, however, as in this instance, accidental, and does not constitute a specific disease. The characteristics of the anemia are, as already shown, those of secondary anemia in infancy, and the enlargement of the spleen is merely a manifestation of the same disturbance of nutrition which is responsible for the anemia. It is better to speak of it, therefore, as SECONDARY ANEMIA WITH SPLENIC TUMOR.

Prognosis. The prognosis is perfectly good. When the underlying disturbance of nutrition is corrected the spleen will diminish rapidly in size and the anemia will quickly improve. The spleen will probably not be palpable after

two or three months and the blood will be normal at least as soon.

Treatment. The treatment is regulation of the diet to correct the disturbance of nutrition. The administration of iron will also hasten the return of the blood to normal. The following mixture is a suitable one for her:

Fat,	4%
Sugar,	7%
Proteids,	2.50%
Starch,	0.75%

There is no indication for the addition of an alkali. Six feedings of five ounces will much more than supply the caloric needs indicated by her weight, but will probably be no more than are required when her age and surface area are taken into consideration.

One or two tablespoonfuls of beef juice, once daily, given at the same time as one of her feedings, will aid in supplying the needed iron. It will be wiser, however, to give iron in addition. It may be given as the saccharated carbonate or in the form of ferratin. The dose of the former is three grains; that of the latter, two grains, three times daily.

CASE 146. George S., eight years old, was the child of healthy parents. Three brothers were well. One child had died of tubercular meningitis and another was born dead at full term. There had been no miscarriages. There was no history of hemorrhages in either family, except that the daughter of a maternal aunt, when eight years old, had bled steadily for twelve hours after the extraction of a tooth. She had had, however, no other hemorrhages before or since. His mother had had what was called chlorosis at the time of puberty. He had never been outside of eastern Massachusetts.

He was born at full term, after a normal labor, and weighed five and one-half pounds. He was nursed for five months and did well. He had whooping-cough when six months old, pneumonia at one year and measles at one and one-half years. He had been well since then, but had always been a little pale. Five months before he was seen he complained of headache without obvious cause, and the next morning had a severe nosebleed which was finally stopped, after two hours, by plugging the anterior nares. He had been somewhat paler since the nosebleed but was considered well. He always had more or less "black and blue" spots on him, however, some of which were apparently not due to injuries. A week before he was seen he became listless and much paler. There had been a little bleeding from the gums during the last two days. His appetite was good. He had no symptoms of indigestion, his bowels moved regularly and the stools did not contain blood. He had no dizziness, headache or dyspnea. He was admitted to the Children's Hospital, August 16.

Physical Examination. He was poorly developed and nourished and somewhat listless. There was marked pallor of the skin and mucous membranes. His teeth were poor, but the gums were healthy and there was no bleeding from them. The area of cardiac dullness was normal and the action regular. The first sound was somewhat feeble and there was a systolic murmur over the whole precordia. There was a venous hum in the neck. The lungs and abdomen were normal. The upper border of the liver flatness was at the sixth rib in the nipple line; the lower border was just palpable

below the costal border in the same line. The spleen was not palpable. The extremities were normal. There was no enlargement of the peripheral lymph nodes. There were a few ecchymoses on the legs and thighs. The temperature was normal.

The urine was clear, acid in reaction, of a specific gravity of 1015 and contained neither albumin nor sugar. The sediment showed nothing abnormal.

The stools showed that there was no disturbance of the digestion of any of the food elements. They contained some mucus but no blood or pus. All foods containing blood were stopped for forty-eight hours. The stools were then examined by the guiac test and no blood found.

A skin tuberculin test was negative.

BLOOD.

Hemoglobin	18% (Sahli)
Red corpuscles	672,000
White corpuscles,	8,000
Small mononuclears,	37%
Large mononuclear and transition forms,	10%
Polynuclear neutrophiles,	49%
Eosinophiles,	4%

There was some achromia and slight poikilocytosis and stippling of the red cells. Many of the red cells were as large as the leucocytes. No nucleated red cells were seen and no abnormal forms of white cells. Many of the white cells were broken down. The coagulation time was two and one-half minutes.

He was kept under observation at the hospital and at the Convalescent Home until Nov. 1. During this time he had no hemorrhages and gained in weight. He said that he felt well and while at the Convalescent Home was able to play with the other children. Repeated examinations of the stools failed to find either parasites or their ova and no plasmodia were found in the blood. He was unable to take arsenic, even in minute doses, without showing toxic symptoms. He apparently did as well, or better, without iron than with it, whether it was given by mouth or under the skin. He was still pale and waxy. The murmur in the

heart and the venous hum were still present. The liver and spleen were not palpable. There was no enlargement of the peripheral lymph nodes.

BLOOD.

Hemoglobin,	20% (Sahli)
Red corpuscles,	790,000
White corpuscles,	3,800
Small mononuclears,	41%
Large mononuclears and transition forms,	2%
Polynuclear neutrophiles,	57%

There was slight polychromatophilia and considerable macrocytosis, but very little poikilocytosis. There was no stippling of the red cells and no nucleated cells were seen. There were no abnormal forms of white cells. The blood platelets numbered 320,000. The coagulation time was two and one-half minutes. The clot was normal.

Diagnosis. The history of the bleeding in his cousin and of the severe nosebleed and "black and blue spots" in the past, together with the recent oozing from the gums, suggest hemophilia. When it is remembered that the cousin is a girl, that she had had no other hemorrhages and that he has had but one severe hemorrhage, this history is, however, much less suggestive. The normal coagulation time of the blood and the normal character of the clot, are, moreover, sufficient to exclude hemophilia. The characteristics of the blood are not those of leukemia. An aleukemic stage would hardly last so long and there is no excess of lymphocytes. There is, moreover, no enlargement of the spleen or lymph nodes. The fact that he has never been outside of eastern Massachusetts, together with the absence of parasites and their ova in the stools at repeated examinations, rule out anemia from the hookworm or other intestinal parasites. The absence of blood in the stools by the guiac test shows that there is no concealed intestinal hemorrhage. There is nothing in his history or physical examination to account for the anemia. It did not improve, moreover, when he was in the country and having good food. The anemia is more marked than is usual in secondary anemia without obvious cause, the color index is slightly above normal, there is a

considerable macrocytosis and there is no leucocytosis. It is almost certain, therefore, that, in spite of the normal number of blood platelets and the absence of a relative lymphocytosis, the anemia is of the primary rather than of the secondary type. There are usually, however, marked morphologic changes in the red corpuscles and many normoblasts and megaloblasts in pernicious anemia, which is not the case in this instance. The absence of morphologic changes in the red cells and of nucleated cells is characteristic of the blood picture in the aplastic type of this disease, so that it cannot be excluded on this account. In this type, however, there is usually little or no macrocytosis and a marked diminution in the polynuclear neutrophiles. It is evident, therefore, that the blood picture does not exactly correspond to that of any of the types of anemia. Taking everything into consideration, however, a probable diagnosis of PERNICIOUS ANEMIA of the APLASTIC TYPE seems justified.

Prognosis. If the diagnosis is correct, the prognosis is hopeless. He will probably not live many months.

Treatment. There is very little to be done for him medicinally. He cannot take arsenic and does better without iron than with it. The most that can be done, therefore, is to take the best possible care of him, to feed him as well as possible, to keep him quiet and to give him the maximum amount of fresh air and sunlight.

CASE 147. Lester J. had always been well, but a little delicate. A slight enlargement of the cervical lymph nodes was noticed about the first of June. It had not increased materially up to July 10, when he came down with scarlet fever. The scarlet fever was of a very mild type and he was out of quarantine August 13. The swelling in the neck increased very rapidly after the onset of the scarlet fever. The temperature rose again August 20 and ran between 103° F. and 104° F. Enlargement of the spleen was noticed for the first time August 23, but may have been present before, as it had not been looked for until that time. The size of the liver was not investigated. The mouth and throat became sore August 26, and several spots of membrane appeared in the mouth. A culture showed no diphtheria bacilli. He had had no disturbance of digestion, looseness of the bowels or hemorrhages, and had not lost weight, strength or color. He had not seemed seriously sick until a few days before he was seen in consultation, August 27, when six years old.

Physical Examination. He was small, slight and flabby, but not very pale. There was an ulcerated area, the size of a dime, covered with false membrane, on the left side of the mouth. The whole throat was slightly reddened. The tonsils were moderately enlarged. The tongue was somewhat dry and slightly coated. There was no nasal discharge. There was a large mass of discrete, non-tender lymph nodes in the left side of the neck, which filled up the whole neck, extending forward even with the chin and downward to the clavicle. There were numerous small lymph nodes in the right side of the neck. There was no dullness under the manubrium or in the middle of the back, and the bronchial voice sounds did not extend below the seventh cervical spine, showing that there was no considerable enlargement of the bronchial lymph nodes. There was no venous hum in the neck. The heart, lungs and abdomen were normal. The upper border of the liver flatness was at the upper border of the fifth rib (normal is in the fifth space). The lower border was palpable, running from just above the right anterior superior spine, through a point two thirds the distance from the ensiform to the navel,

to the left costal border in the nipple line. The surface of the liver was hard and smooth, the edge rounded. The spleen was palpable, running out from the costal border between the left nipple and anterior axillary lines, downward and forward almost to the median line, backward to the left anterior superior spine and upward into the flank. The surface was smooth, the consistency hard, the edge rounded, the notch distinct. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There were numerous lymph nodes, the size of marbles, in the axillæ and groins, and one, the size of a walnut, on the occiput. The epitrochlear lymph nodes were not palpable. The mouth temperature was 104° F.

The urine was high in color, extremely acid in reaction, and of a specific gravity of 1,032. It was loaded with urates, but contained no albumin or sugar. The sediment showed a few small round cells, but no casts.

BLOOD.

Hemoglobin,	70%
Red corpuscles,	3,520,000
White corpuscles,	128,000
Mononuclears (almost entirely lymphocytes),	99.2%
Polynuclear neutrophiles,	.6%
Myelocytes,	.2%

There was a very little variation in the size of the red corpuscles, but none in their shape or color. No nucleated cells were seen while counting five hundred white corpuscles.

Diagnosis. Without the examination of the blood the diagnosis would lie between lymphatic leukemia and Hodgkin's disease. The enlargement of the liver and the ulceration of the mouth would, however, make lymphatic leukemia the more probable. The examination of the blood proves conclusively that the trouble is LYMPHATIC LEUKEMIA. The enlargement of the lymph nodes preceded the attack of scarlet fever by six weeks. It is almost certain, therefore, that this was merely a coincidence and that it played no part in the etiology of the leukemia.

Prognosis. The prognosis is absolutely hopeless. He will probably not live more than one or two weeks.

Treatment. There is nothing to be expected from treatment. Arsenic and iron should be tried, however, with the hope that they may alleviate the condition and perhaps prolong life. The arsenic is best given in the form of Fowler's solution. It will be well to begin with three drops, three times a day, increasing the dose one drop daily until the physiological limit is reached. Other treatment must be symptomatic.

CASE 148. Mary C., three years old, was the only child of healthy parents. There had been no deaths or miscarriages. She was born at full term after a normal labor, was normal at birth and weighed eight pounds. She was nursed for seven months and did very well. Since then she had taken milk well, but it had been very hard to induce her to take other food. She had, nevertheless, been very well.

Seven weeks before she was seen in consultation she began to seem a little out of sorts and to lose color. The chief symptom had been anorexia and the greatest difficulty had been experienced in getting her to take anything, even milk. She had vomited occasionally, probably as the result of the forcing of food rather than of indigestion. There had been a tendency to constipation, which had been easily relieved by castoria. The movements had been well digested. Her only complaint was of being tired. She did not want to play with other children, but preferred to keep quiet or lie down. She had not lost weight but had steadily lost color. Purpuric spots had appeared on the legs a week previously. She had slept poorly and perspired freely. She had had no fever.

Physical Examination. She was well developed and nourished, but very pale. Her flesh was firm. There was no edema. The tongue was clean, the mouth and throat normal. There was a venous hum in the neck. The heart was normal, except for a slight systolic murmur at the pulmonic area, which was not transmitted. The lungs were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There were a dozen or more purpuric spots, varying in size from that of a split pea to that of a dime, scattered over the arms and legs, there being more on the legs than on the arms.

BLOOD.

Hemoglobin,	25%
Red corpuscles,	2,560,000
White corpuscles,	15,400
Lymphocytes,	99%
Polynuclear neutrophiles,	1%

There was a little variation in the size and shape of the red corpuscles, but most of them were of normal size. There was moderate achromia, but no polychromatophilia. There was no stippling. One normoblast was seen for each one hundred leucocytes. No plasmodia or blood plates were seen.

Diagnosis. The diagnosis lies between a rather severe anemia, secondary to an insufficient or improperly balanced diet over a long period, with lymphocytosis, and lymphatic leukemia in an aleukemic stage. The symptomatology is consistent with either diagnosis. The diminution in the hemoglobin and in the number of the red corpuscles, as well as the morphological changes in them, are consistent with either condition. A percentage of lymphocytes as high as ninety-nine per cent is practically unheard of outside of lymphatic leukemia and is of far more importance in differential diagnosis than the comparatively slight increase in the total number of the white cells, because the number of white cells is often for a time but little increased in lymphatic leukemia. The absence of blood plates is of itself, moreover, sufficient to turn the scale in favor of leukemia, in which the blood plates are markedly diminished, while in secondary anemia they are normal or increased in number. The lymph nodes and spleen are usually, but not always, enlarged in lymphatic leukemia. The absence of such enlargement in this instance does not, therefore, rule it out. The diagnosis is, therefore, LYMPHATIC LEUKEMIA.

Prognosis. The prognosis is absolutely bad. She will probably not live more than one or two months.

Treatment. She must, if possible, be made to take a more varied diet. If she will not take sufficient food, it must be given through a stomach tube, passed through the mouth. There is little to be expected from medicinal treatment. Arsenic and iron should be tried, however, with the hope that they may alleviate the condition and perhaps prolong life. The arsenic is best given in the form of Fowler's solution. It will be well to begin with two drops, three times daily, increasing the dose one drop daily until the physiological limit is reached. Other treatment must be symptomatic.

CASE 149. Carl G. was the only child of healthy parents and was born at full term. His mother had had one miscarriage at six months, probably as the result of albuminuria. He lived on a farm in the country and had always drunk the unsterilized milk from a herd of cows which had for many years been infected with tuberculosis. He had had measles and chicken-pox as a baby and an abscess in the neck at two years, which was opened and healed well.

He began to be out of sorts about the first of January, when six and one-half years old. There were no very definite symptoms, however, so that a physician was not called until about the middle of March. He found that the boy was running an irregular temperature, which at times went as high as 103.5° F., and that he had an enlarged liver and a very large spleen. The urine showed nothing abnormal. The leucocytes numbered 6,000. Typhoid fever was suspected, but a Widal test was negative. He then improved for a time in every way and probably had little or no fever, although his temperature was not taken. He was up and about, played out of doors and seemed much like himself, except that he was easily tired.

The fever returned about the middle of August. The temperature was very irregular, most of the time being normal or subnormal, but reaching 103° F. or 103.5° F. for a time almost every day. Malaria was suspected, although there were no chills or sweating. Several examinations of the fresh blood failed, however, to show any plasmodia, and there was no change in the temperature when quinine was given. There had been no change in the size of the liver and spleen. The urine showed nothing abnormal. The red corpuscles numbered 3,700,000 and the white corpuscles, 6,000. He had lost some color. His appetite and digestion had been good throughout and he had not lost weight. He had had no cough, but several nosebleeds, one of them very severe. He was seen in consultation, August 29, when a little more than seven years old.

Physical Examination. He was fairly developed and nourished, but moderately pale. He did not look especially sick. His tongue was clean and moist, his teeth poor. The

nose and throat were normal. There was no venous hum in the neck. The heart and lungs were normal. The abdomen was considerably enlarged, but there were no evidences of fluid and no masses were felt. The superficial abdominal veins were not enlarged. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line (normal is in fifth space) and at the upper border of the ninth rib in the scapular line (normal is at the tenth rib). The lower border of the liver was palpable, running out from the right flank, 4 cm. below the costal border in the right anterior axillary line, through a point two thirds the distance from the tip of the ensiform to the navel, and under the costal border in the left nipple line. The liver was not tender, its surface was smooth, its edge sharp. The spleen was palpable, running out from beneath the costal border in the left nipple line, downward and inward nearly to the navel, downward and outward to below the level of the left anterior superior spine, then backward into the flank, which it filled. It was firm, smooth and not tender. The edge was somewhat rounded, the notch distinct. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes and no evidence of enlargement of the tracheo-bronchial lymph nodes. There was no edema. There was no eruption and no scars of old eruptions.

The urine was normal in color, acid in reaction, of a specific gravity of 1,020, and contained neither albumin nor sugar. The sediment showed nothing abnormal.

BLOOD.

Hemoglobin,	90%
Red corpuscles,	3,520,000
White corpuscles,	5,700
Mononuclears (the majority small),	60.0%
Polynuclear neutrophiles,	38.7%
Myelocytes,	1.3%

The red corpuscles showed no changes in size, shape or coloring, and no nucleated cells or plasmodia were seen.

Diagnosis. The diagnosis lies between lymphatic leu-

kemia in an aleukemic stage, Hodgkin's disease and that very indefinite class of cases known as splenic anemia or anemia with splenic tumor. Tuberculosis, which is suggested by the prolonged use of milk from a tuberculous herd, can be excluded by the absence of signs of tuberculosis elsewhere, the slight impairment of the general condition after six months, the fact that the liver and spleen are apparently alone involved and that the enlargement of these organs is regular. A tuberculin test would not be of much assistance. If negative, it would, of course, exclude tuberculosis, but, if positive, it would not prove that the enlargement of the liver and spleen and the fever are tubercular in origin. Syphilis can be ruled out on the good family history, the previous good health, the fever and the absence of all other signs of syphilis in the past or present. Cirrhosis of the liver is rendered very improbable by the absence of cause, ascites, jaundice and enlargement of the superficial abdominal veins, the fever and the relatively great enlargement of the spleen.

Lymphatic leukemia in an aleukemic stage can be practically eliminated on the duration of the illness, the low white count on several occasions (the aleukemic stage usually being a short one), the absence of morphological changes in the red cells and the marked enlargement of the liver and spleen without enlargement of the lymph nodes.

The fever, the condition of the blood, the enlargement of the liver and spleen and the relatively slight impairment of the nutrition are all consistent with Hodgkin's disease. It is almost unheard of, however, to have so much enlargement of the liver and spleen without enlargement of either the superficial or deep lymph nodes. Hodgkin's disease can, therefore, be excluded.

The most probable diagnosis is, therefore, splenic anemia, or better, ANEMIA WITH SPLENIC TUMOR. This is, however, not a very satisfactory diagnosis because it does not describe a definite pathological entity, but is merely a term applied to a group of cases in which there is enlargement of the spleen and anemia, but of which the pathology and etiology are very varied. It is at present, however, impossible to classify them any more accurately.

Prognosis. The prognosis is very uncertain. He may gradually improve and grow up with a large liver and spleen, which do not cause any symptoms or inconvenience, or they may both finally return to their normal size. He may, on the other hand, fail rapidly and die in a few months or live on for some years and then die. The chances are that he will not live more than a year.

Treatment. The treatment must, in the main, be hygienic and symptomatic. It will be well to try arsenic thoroughly. It is best given in the form of Fowler's solution. It will be well to begin with three drops, three times a day, increasing the dose one drop daily until the physiological limit is reached. It should then be continued, in doses somewhat below the physiological limit, for several months. If he does not improve, or continues to fail, splenectomy ought to be considered, because, while it is a serious operation and if successful does not always relieve the symptoms, it sometimes results in a cure.

CASE 150. William S. was the only child of healthy parents. There had been no deaths or miscarriages. There was no history of tuberculosis in either family and there had been no known exposure to it. He was born at full term, was normal at birth, was nursed for nine months and had always been perfectly well. A small gland was noticed in the left side of the neck in the latter part of January. Another gland was noticed on the right side about two weeks later. He also lost a little weight and color and his digestion was not quite as good as usual. The glands increased in size, so that by the first of March they were as large as pigeons' eggs. A skin tuberculin test at that time was negative. He was then given malt extract and his diet regulated. His general condition improved rapidly, but there was no diminution in the size of the glands. He passed into the hands of another physician about the middle of April. This physician prescribed the syrup of the iodide of iron, which he had taken continuously since that time. The glands began to enlarge again, however, and had continued to increase steadily in size. Enlarged glands were discovered in the groins and axillæ about the middle of July. His mother did not know whether they had grown larger since then or not. His temperature had never been taken, but his mother thought that he had been a little feverish at night. His appetite and digestion were good and he had not lost weight or color. His neck had seemed a little tender during the past week, but was not painful. He was seen in consultation, September 13, when three years old.

Physical Examination. He was well developed and nourished and of fair color. The whole of both sides of the neck was filled up with a hard, non-tender mass, which extended well backward and so far forward that the chin was hardly distinguishable. The swelling ran up behind the ears, but not in front of them. Discrete glands could be made out in some places, but in others the surface was smooth. There was no heat or redness. A chain of glands, varying in size from that of a marble to that of a robin's egg, could be felt running down behind the clavicles. The pupils were equal and reacted to light. The tongue was clean, the teeth good

and the throat normal. He kept his mouth shut and there was no nasal discharge. There were several glands, the size of large beans, in each axilla and the epitrochlear glands were as large as peas. There was no dullness under the sternum, the respiratory sound was the same on both sides and the bronchial voice did not extend downward below the cervical spines. The heart and lungs were normal. No enlarged glands were found in the abdomen. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line. The lower border was palpable six cm. below the costal border in the same line. Its surface was smooth. The spleen was just palpable. There were numerous glands, varying in size from that of a pea to that of a robin's egg, in both groins. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There were no mucous patches or rhagades. There was no eruption and there were no scars of former eruptions.

BLOOD.

Hemoglobin,	75%
Red corpuscles,	4,500,000
White corpuscles,	24,800
Mononuclears,	19%
Polynuclear neutrophiles,	81%

The red corpuscles were normal in every way and no abnormal forms of the white cells were seen.

Diagnosis. The bilateral enlargement of the glands in the neck and the general distribution of the glandular enlargement, as well as the enlargement of the liver and spleen, are strong evidence against tuberculosis as the cause of the adenitis, while the absence of a history of tuberculosis does not count in any way against it. It is excluded by the negative tuberculin test. There is nothing in the history to suggest syphilis and there are no physical signs of syphilis either at present or in the past. Enlargement of the lymph nodes to this extent from syphilis is, moreover, very unusual, especially without other marked signs of the disease. Syphilis can, therefore, be excluded. Leukemia can be excluded on the results of the examination of the blood. It is more

difficult to rule out lymphosarcoma. The chief points against it are the good general condition after nine months, the absence of involvement of the adjacent structures, the absence of enlargement of the tracheo-bronchial lymph nodes after so many months and, more than all, the fact that the whole picture is so absolutely characteristic of PSEUDO-LEUKEMIA or HODGKIN'S DISEASE. The appearance of the enlargement in the cervical glands first, the general distribution of the adenitis, the enlargement of the liver and spleen, the mild anemia and the slight polynuclear leucocytosis are all so typical of the early stage of this disease that there can be no doubt that this is the true diagnosis.

Prognosis. While some cases of this disease are said to have recovered, they are so few in number and the diagnosis in them is open to so much doubt that the prognosis is practically hopeless. He will, however, probably live for a number of years to die finally from cachexia or from the results of the pressure of the enlarged tracheo-bronchial and mediastinal glands on the adjacent organs. Remissions in the symptoms and temporary diminutions in the size of the glands may be expected.

Treatment. Arsenic is the most useful drug in this disease. He should be given two drops of Fowler's Solution, well diluted with water, three times daily, after eating. The dose should be increased one drop daily until the limit of tolerance is reached. It should then be stopped for a few days, after which the dose should be two drops less than the one which caused the toxic symptoms. The drug should be given in this dose, with occasional intermissions, for many months. There is, of course, some danger of causing a peripheral neuritis. This happens comparatively seldom, however, and the good which the arsenic does justifies the risk. Treatment with the Rœntgen ray has diminished the size of the glands in many instances and ought to be given a thorough trial. Local treatment is useless. The removal of the glands should not be undertaken unless they are causing serious symptoms from pressure on other organs.

CASE 151. Charles C. was the first child of healthy parents. One younger child was well; there had been no deaths or miscarriages. He was born at full term, after a normal labor, was twenty-four inches long and weighed ten and one-half pounds. He was nursed entirely for five months, after which he was given diluted cows' milk in addition. He cried almost constantly until he was fifteen months old, but did not vomit and had normal stools. He was always pale, however, and enlargement of the abdomen and spleen were noticed at that time. He had a very severe attack of whooping-cough when he was twenty months old, followed in a few months by chicken-pox and scarlet fever.

Early in February, 1909, when nearly three years old, he vomited a large amount of blood and had a number of tarry stools. He was treated in the Children's Hospital for nine weeks. His blood at entrance showed 55% of hemoglobin, 2,112,000 red corpuscles and 25,700 white corpuscles, of which 17% were lymphocytes and 83% polynuclear neutrophiles. There was no achromia and but little polychromatophilia. The red corpuscles varied somewhat in size, but not in shape. The blood platelets were normal. Three days later the hemoglobin had dropped to 30% and the red corpuscles to 1,474,000, but the morphology of the red cells was unchanged. The blood, when he was discharged from the hospital two months later, showed 70% of hemoglobin, 3,224,000 red corpuscles and 6900 white cells. The differential count showed:

Small mononuclears,	28.5%
Large mononuclears,	1.5%
Polynuclear neutrophiles,	66.5%
Eosinophiles,	3.5%

The red cells showed slight achromia and slight variation in size. There were no nucleated cells and the blood platelets were normal.

The liver was palpable three cm. and the spleen four cm. below the costal border when he entered the hospital. When he was discharged the liver reached but one cm. below the

costal border, while the size of the spleen was unchanged. The abdomen was rather large, but otherwise normal. The urine showed nothing abnormal and a skin tuberculin test was negative.

He was perfectly well from that time on, except that he was pale and had a large abdomen. He ate everything and had no symptoms of indigestion. In February, 1911, he had another attack, without known cause, in which he vomited a considerable amount of blood and had tarry stools. He was treated at that time in the Massachusetts General Hospital. His blood then showed 40% of hemoglobin and 1,500,000 red corpuscles, but when he left the hospital it contained 65% of hemoglobin and 3,500,000 red corpuscles. Nothing was found in the throat to account for the bleeding.

He was seen March 11, 1911, just after his discharge from the hospital. He was then five years old. He was very pale and weak. There was a venous hum in the neck and a systolic murmur over the whole precordia. The heart was otherwise normal. The lungs were normal. The liver was not palpable, but the spleen extended seven cm. below the costal border. He improved rapidly in every way after this and was well, except for an attack of diarrhea in July, 1911. He was admitted to the Children's Hospital for observation, August 3, 1911, when five and one-half years old.

Physical Examination. He was fairly developed and nourished and of fair color. His tongue was clean, his teeth in fair condition and his throat normal. There was a slight venous hum in the neck. The heart and lungs were normal. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line; the lower border was not palpable. The spleen was palpable eight cm. below the costal border. It was hard and smooth. The edge was rounded, but the notch was not felt. The abdomen was large and lax, but otherwise normal. The genitals were normal. There was no enlargement of the peripheral lymph nodes. The skin was normal and there were no scars of old eruptions, no mucous patches and no rhagades. The rectal temperature was normal.

The urine was normal in color, acid in reaction, of a specific gravity of 1018 and contained neither albumin nor sugar.

BLOOD.

Hemoglobin,	90% (Sahli)
Red corpuscles,	6,896,000
White corpuscles,	6,600
Mononuclears,	21%
Polynuclear neutrophiles,	79%

The red corpuscles were normal in every way and there were no plasmodia.

A skin tuberculin test was negative.

Diagnosis. The important points in this case are the recurrent hemorrhages, the temporary enlargement of the liver and the enlargement of the spleen. The blood has never shown anything more than the evidences of a secondary anemia from hemorrhage and is now normal. Ulcer of the stomach can be ruled out on the rarity of this condition in early childhood, the absence of other symptoms of ulcer and the enlargement of the spleen. Hereditary syphilis, which is suggested by the enlargement of the spleen, can be excluded on the good family history, the absence of all other evidences of syphilis in the past or at present, the absence of enlargement of the liver and the fact that hemorrhages of this severity very seldom occur in syphilis except in the severest cases and in connection with other very marked symptoms of the disease. The enlargement of the spleen cannot be due to malaria, because there are no plasmodia in the blood and because hemorrhages do not occur in this disease. It is harder to exclude cirrhosis of the liver. The age at the onset of the symptoms, the absence of a cause, the normal size of the liver, which is almost invariably enlarged in cirrhosis in childhood, and the absence of ascites and jaundice seem sufficient, however, to rule it out. The hemorrhages show that the enlargement of the spleen is not merely the result of some disturbance of nutrition in the past. Pseudoleukemia can be excluded on the absence of enlargement of either the superficial or deep lymph nodes after two and one-half years. The case undoubtedly belongs, there-

fore, in the very indefinite class of diseases known as primitive splenomegaly, splenic anemia or Banti's disease. It does not correspond exactly, however, to any of the recognized types, simple splenomegaly, Banti's disease, the family or infantile form of Gilbert and Fournier or the chronic endothelioma of the spleen of Gaucher. The distinctions between these types are so indefinite clinically and there are so many cases that do not correspond to any of them that it hardly seems worth while to compare this case with each one of them in detail. The diminution in the size of the liver coincidently with an increase in the size of the spleen and the severe hemorrhages make it resemble, however, the picture of BANTI'S DISEASE more than that of the others. There is, however, no pigmentation of the skin and at present no anemia.

Prognosis. If he does not die suddenly from hemorrhage, he will probably live for many years to eventually die with the symptoms of cirrhosis of the liver. There is, of course, no way to determine whether he will have more hemorrhages or not. The chances are, however, that he will. If he does, any one of them may prove fatal.

Treatment. There is nothing to be hoped from medicinal treatment, as there is no drug that can affect in any way the size of the spleen or diminish the chances of hemorrhage. It is possible that treatment with the Roentgen ray may diminish the size of the spleen. This method should, therefore, be tried. If it does not do so materially, the spleen should be removed, because if it is not removed he is liable to a hemorrhage, which may prove fatal, at any time. The spleen is not adherent, the boy is in good condition and should, therefore, stand the operation well. The chances of death from the operation are, therefore, less than the chances of death from hemorrhage if the spleen is not removed.

SECTION XII.

DISEASES OF THE NERVOUS SYSTEM.

CASE 152. Ronald P., six years old, was the only child of very nervous parents. His father was alcoholic, but there was no history of syphilis. His home surroundings were very exciting and he was under little control. He had an ungovernable temper and was in the habit of biting, fighting and swearing when opposed. He had had the croup every winter, but no other affections of the respiratory tract. His diet was a fair one for the country, and his appetite and digestion were good. He had had no other illnesses.

Three months before he was seen in consultation he began to throw his arms up over his head in a peculiar manner, the motions always being the same. A diagnosis of chorea was made by his physician and he was given Fowler's solution. Soon after taking this he began to clear his throat constantly, while there was no diminution in the movements of his arms. More than nine drops of Fowler's solution a day caused edema of the eyelids, congestion of the conjunctivæ and a nasal discharge. He had taken it fairly regularly in small doses, however, up to the time he was seen. He had begun to shrug his shoulders about six weeks before. The peculiar motions of the arms, the clearing of the throat and the shrugging of the shoulders all persisted. The movements and the clearing of the throat ceased during sleep. He did not seem sick in other ways.

Physical Examination. He was fairly developed and nourished and of good color. He was very excitable and was constantly clearing his throat and shrugging his shoulders during the examination. He could keep still when he tried. The pupils were equal and reacted to light and accommodation. There was no coryza and he kept his mouth shut. Examination with the finger showed no adenoids. The throat was normal. The tongue was clean and was protruded

without tremor. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and slightly diminished. Kernig's and Babinski's signs were absent. There was no ankle clonus. The cremasteric reflexes were normal, the abdominal lively. The genitals were normal. There was no enlargement of the peripheral lymph nodes. There was no eruption and no irritation of the skin.

Diagnosis. The diagnosis lies betweeen chorea and habit spasms. The clearing of the throat is not at all like chorea, the motions are limited in number and always the same, he can control them to a considerable extent, and there is no tremor of the tongue. Chorea can, therefore, be excluded and a positive diagnosis of HABIT SPASMS made. These are especially likely to develop in children of neurotic parentage and living in exciting surroundings, as in this instance. There is usually some local cause for the development of the individual spasms, such as an uncomfortable hat, a badly fitting collar or a poorly adjusted suspender. No definite cause for the motions of the arms and the shrugging of the shoulders was made out in this boy. The irritation of the nose and throat caused by the arsenic was presumably the primary cause of the clearing of the throat; its continuance is due to the underlying neurotic condition.

Prognosis. These habit spasms never lead to chorea. They are likely to persist for long periods, however, or to be replaced by others, because, even if the local cause can be found and removed and the individual spasm relieved, it is very difficult to get at the underlying trouble, that is, the inherited neurotic temperament. The prognosis is worse than usual in this instance, because the home surroundings are so bad and because he has not been controlled in the past.

Treatment. The treatment of habit spasms can be divided into three parts: that directed to the removal of the local cause of the individual spasm, if it is still present; that of the individual spasm; and that directed to the improvement of the underlying neurotic condition. Nothing was found in this instance to account for the peculiar motions of the

arms or the shrugging of the shoulders. The local cause, whatever it was, must, therefore, have been accidentally remedied. The best treatment for the shrugging of the shoulders and the motions of the arms is to have him make these motions before a mirror for several minutes, several times daily. What is at present an involuntary act will come by practice under the control of the will again and hence be performed only voluntarily. The arsenic, which was, by the irritation which it caused, presumably the original cause of the clearing of the throat, has already been stopped. It is possible, however, that some local irritation still persists. This can be treated by some mild alkaline or oily spray like the liquor antisepticus alkalinus of the Pharmacopeia, or the following mixture:

Menthol,	1 gr.
Camphor,	1 gr.
Liquid albolene,	1 oz.

The treatment of the underlying neurotic condition is a very difficult matter. It includes, in the first place, regulation of his home surroundings in general. It is probable that little can be done in this direction. His diet, exercise, amusements and rest must all be carefully laid out. He must have much fresh air and ought not to go to school at present. Drugs will probably not be of much assistance, although the tincture of nux vomica in five-drop doses, three times daily, before meals, and eisenzucker or ferratin in five-grain doses, three times daily, after meals, may be of some assistance.

CASE 153. Miriam T., three years old, was the first child of nervous and not very vigorous parents. She had always been somewhat delicate and very excitable. She had for some weeks been having one or more attacks, almost every evening, in which she cried out as if in terror. She was usually awake by the time her mother or her nurse reached her and was almost always able to tell what it was that she feared. These were usually things which she had seen or heard about during the day. It was learned, on questioning, that both her mother and her nurse had been in the habit of reading and telling stories to her, which were much too old for her. She had recently been unwilling to go to sleep in her room alone. Her diet was a good one and she had only cereal and bread with milk for supper. She had no symptoms of indigestion. She was a very active child and wanted to be on her feet all the time. She had a rest of an hour at noon, but did not go to sleep. She was, therefore, as a rule, very tired and irritable by night.

Physical Examination. She was fairly developed and nourished and of good color. She was mentally precocious and highly excitable, but docile and easy to examine. There was no nasal discharge or obstruction. Her tongue was clean. There was no enlargement of the tonsils and no adenoids could be felt with the finger. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and unusually lively. There was no enlargement of the peripheral lymph nodes.

Diagnosis. There can be no doubt, of course, as to the diagnosis of PAVOR NOCTURNUS. The normal condition of the nose and throat shows that the attacks cannot be due to imperfect oxidization as the result of obstruction to the respiration. The absence of all symptoms and signs of indigestion, together with the fact that she has a light supper, rule out indigestion as the cause. Moreover, when night terrors are due to disturbances of the digestion, the children are very seldom able to tell of what they are afraid; in fact, they often do not know, when awakened, that they have cried out or been afraid. When night terrors are due to an un-

stable and overstimulated nervous system, however, the children almost always know of what they are afraid, not only during the attack, but also after they are awake. The attacks in this instance are of this type. It is easy to see why her nervous system is unstable and overstimulated. She is the neurotic child of neurotic parents, plays too hard and has too little rest, and is excited and worried by stories which require an excessive amount of mental effort on her part or which she can only partly understand.

Prognosis. The attacks will gradually diminish in frequency and finally cease, if her life is so regulated that she does not get overtired, either physically or nervously, and hears only such stories as are suitable for her age.

Treatment. The treatment consists in regulating her life so that she does not get overtired, in guarding her from excitement and in stopping all stories which are liable to disturb or frighten her. She must not be allowed to run about as much as she pleases, but must be wheeled in her carriage or taken out to drive a part of the time. She must have a long rest at noon and get to bed by half-past five in the afternoon. She must be left to amuse herself as much as possible and must not be played with any more than is absolutely necessary. She ought not to see anyone outside of her immediate family. If any stories are told to her, they must be simple and have nothing in them which is unpleasant or exciting. It will be well to give her ten grains of the bromide of soda at bedtime for a few nights in order to break the habit of waking up in the early evening, into which she has fallen.

CASE 154. Porter M., four years old, was the fourth child of healthy parents. He was born at full term after a normal delivery and was normal at birth. His father had had several convulsions when a child. One of his brothers, ten years old, was in an asylum for epileptics for convulsions which began after a fall out of bed at two years.

He had always been perfectly well up to six months before, when, in common with his sister, he had an acute attack of fever and vomiting, apparently due to drinking milk from a sick cow. Both had convulsions at the onset of the illness. His sister had no more. He was in bed four days and had several convulsions during that time. His next convulsion was two weeks after he was up and about. Since then he had had a great many convulsions, lasting from one to five minutes. His mother thought that he did not lose consciousness in them. He never frothed at the mouth, bit his tongue or passed urine or feces. He also had many very short attacks in which he apparently lost consciousness momentarily, dropped things, stared for an instant and so on, but never fell down. Various diets had been tried without effect. He was for some time on a strictly vegetable diet, at another had nothing but malted milk for a month, and at another only milk, bread and cookies. His appetite was good and he had no signs of indigestion except that he was very constipated. The movements at times contained mucus, but were otherwise normal. He had been circumcised and had adenoids removed without any effect on the convulsions. His mental condition was perfectly normal.

About six weeks before he was seen in consultation the convulsions became much more frequent and severe and bromide was begun. Since small doses had no effect on the convulsions, the dosage was increased until he was taking enormous amounts with the addition of chloral. Since taking the bromide he had become so stupid that he could not hold up his head or hold things in his hands, kept his mouth open and drooled constantly. His appetite had fallen off and he had lost considerable weight. The severe attacks were relieved by the bromide, but he continued to

have the mild ones. The bromide had been diminished during the last week and he had begun to be more like himself.

Physical Examination. He was fairly developed and nourished and moderately pale. He took very little notice of his surroundings, although at times he brightened up momentarily and appeared perfectly normal mentally. He held up his head with some difficulty and could hardly sit alone. He could walk with help, but very feebly and unsteadily. He kept his mouth open and drooled constantly. There was no spasm or paralysis of any of the muscles controlled by the cranial nerves. The fundi of the eyes showed nothing abnormal. The ear-drums were normal. The tonsils were large, but not inflamed. The tongue was considerably coated. The heart, lungs and abdomen were normal. The lower border of the liver was just palpable in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. All his motions were, however, unsteady and feeble. The knee-jerks were equal and normal, as were the abdominal and cremasteric reflexes. Kernig's and Babinski's signs were absent. The sensation to touch and pain was slightly dulled. He was circumcised. There was no enlargement of the peripheral lymph nodes.

The urine showed nothing abnormal.

Diagnosis. The bromide intoxication obscures the diagnosis to a certain extent. There is but little doubt, however, that the stupidity and muscular weakness are due to the bromide and not symptoms of any cerebral disease. The omission of the bromide will quickly settle this point. The absence of spasm, paralysis, changes in the reflexes and of Kernig's and Babinski's signs, and the normal condition of the fundi, prove that there is no gross cerebral lesion. The diagnosis lies, therefore, between "idiopathic" epilepsy and reflex convulsions, presumably from disturbance in the digestive tract, since all other causes of reflex convulsions are excluded by the physical examination. The family history is of but little aid, as the tendency to convulsions from slight causes, shown in the father and sister, balances the epilepsy in the brother. The onset of the convulsions

with the onset of an acute disease is somewhat against epilepsy, but does not by any means exclude it, because the first convulsions may have caused some cerebral lesion which resulted in epilepsy, or the acute disease may have lighted up a latent epilepsy. The nature of the attacks, which, according to the parents, are not accompanied by an initial cry or loss of consciousness, is somewhat against epilepsy, but does not exclude it, because a cry is often lacking in epilepsy and because the parents may be wrong as to the retention of consciousness. In fact, they probably are, because if he loses consciousness in the slight attacks he almost certainly does in the more severe ones. On the other hand, the symptoms of disturbance in the digestive tract are hardly severe enough to make it probable that there is sufficient intestinal irritation or toxic absorption from the intestines to cause so many and so severe convulsions. Regulation of the diet and of the bowels has had, moreover, no effect on the number or severity of the convulsions. The chances are, therefore, that the condition really is EPILEPSY. The only way to settle the diagnosis positively, however, is by careful regulation of the diet, bowels and general routine for a considerable time. If the convulsions persist, the diagnosis of epilepsy will be confirmed; if they cease, it will have to be changed to reflex convulsions.

Prognosis. The prognosis depends on the final diagnosis. If this is epilepsy, there is a possibility of recovery, but the chances are very much against it. The convulsions will, however, probably become much less frequent but more severe.

Treatment. The bromide should be stopped for the present in order to determine positively as to his mental and physical condition. He should be put on a diet of milk and starches to diminish intestinal putrefaction and his bowels kept freely open, preferably with some mild saline, like phosphate of soda. There is no objection to adding fruit and green vegetables to the diet for their laxative action. He must, of course, be carefully watched to prevent him from injuring himself during the attacks.

CASE 155. Francis M., eight years old, was the second child of healthy parents. The other child died of diarrhea in infancy. There had been no miscarriages. There was no history of epilepsy in either family. He was born at full term, after a normal labor, and was normal at birth. He was breast-fed for eighteen months and was well, except for mumps at three and one-half years, until he was four years old. At this time he had a series of convulsions lasting twelve hours, followed by a period of unconsciousness lasting thirty-six hours, as the result of an indiscretion in diet following a long walk and playing in the sun all day in August. He was treated in the Children's Hospital at that time and no cause for the convulsions and unconsciousness was found outside of the indiscretion in diet and exposure to heat. He was discharged well at the end of a week.

He began to have convulsions soon after this and had continued to have them. He usually had one or two convulsions a week, but sometimes went two or three weeks without any. They ordinarily came in the early morning, during sleep, and lasted four or five minutes, after which he slept until it was time to get up. He was backward at school, probably because he did not go to school until he was seven years old. His teacher said that he learned fairly easily, but that at times he seemed uninterested. At home he was mischievous and hard to manage.

Four weeks before he was seen, twitching of the right arm and leg, with some weakness and awkwardness of that side, developed and he began to drag his right foot a little when he walked. His speech became a little indistinct. He was restless at night and tossed about the bed, but did not twitch when he was asleep. His appetite continued good and his bowels regular.

Physical Examination. He was well developed and nourished and of good color. He seemed perfectly normal mentally, but his speech was a little indistinct. The pupils were equal and reacted to light and accommodation. The fundi were normal. His tongue was protruded in the median line and was decidedly tremulous. The throat was normal. There were frequent, involuntary twitching movements of

both sides of the face. There was no rigidity of the neck or neck sign. The heart, lungs, abdomen and genitals were normal. The liver and spleen were not palpable. The extremities were normal. There were frequent involuntary movements of the right arm and leg, and occasionally of the left arm and leg. The involuntary movements all ceased when he was asleep. He walked somewhat awkwardly and had rather poor control of his right leg. He was unable to make fine movements with his right arm. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no wasting of the muscles and no disturbance of sensation to touch or pain. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 98.6° F.; the pulse, 90; the respiration, 16.

He was seen in a convulsion. The convulsion was general and clonic and was not preceded by a cry. It lasted about a minute, after which he slept for an hour. The face was cyanotic. There was no frothing at the mouth, but he would have bitten his tongue if the jaw had not been held.

Diagnosis. The character of the convulsions, their frequent repetition without obvious cause, the fact that they occur more often at night than during the day, together with the fact that up to the last month there have been no other symptoms of disturbance of the nervous system, justify a positive diagnosis of IDIOPATHIC EPILEPSY. The next point to be decided is whether the new symptoms which have appeared within the last month are manifestations of the same cerebral lesion which causes the epilepsy or of some entirely distinct condition. The facts that the involuntary motions are more marked on the right side than on the left, that the right arm and leg are not used as well as the left and that there is a disturbance of the speech, suggest that there is a lesion of the cortex in the left motor area. The involuntary motions are, however, not limited to the right side, they are equally active on both sides of the face, the tongue is protruded in the median line, the disturbance in speech is not aphasic in character but merely a manifestation of awkwardness in the use of the tongue, the fundi are normal, there is

no spasm of the extremities and the deep reflexes are normal. These points are sufficient to rule out a localized cortical lesion and point very strongly to chorea. The tremulousness of the tongue is very strong evidence in favor of this diagnosis, while the fact that the motions stop during sleep justifies, in connection with other evidence, a positive diagnosis of CHOREA.

Prognosis. The chorea is of a relatively mild type and recovery may be expected in a few weeks. The only danger from the chorea is of a complicating cardiac lesion. The chances of recovery from the epilepsy are very small, although better than they would be if he was an adult. The convulsions will, however, probably become less frequent but more severe.

Treatment. The most valuable thing in the treatment of chorea is quiet, both physical and mental. He should be put to bed and kept there until the symptoms are much improved, and then allowed to get up gradually. He ought to be left by himself as much as possible. Whoever is with him must be quiet and he must be amused in quiet ways. Visitors should not be allowed. He should, of course, be given all the fresh air and sunlight possible. The next most important point in the treatment is the regulation of the diet. He must be fed liberally with food suitable for his age, due consideration being paid to the fact that he is in bed. There are no special indications as to the kind of diet in chorea. It will be well, however, to keep the meat and eggs low in this instance, because of the epilepsy. It will be wise, on account of the undoubted relationship between chorea and rheumatism, to give him five grains of aspirin, three times daily, after meals, for a time, in order to diminish the chances of the development of endocarditis. His appetite, digestion and color are good and there is, therefore, no indication for the administration of a tonic. Arsenic, in the writer's opinion, has no specific action in chorea, whatever good it may do being due to its action as a tonic. It is not indicated, therefore, in this instance. A warm bath at bedtime will undoubtedly quiet him and may be given oftener, if necessary. If he becomes more restless, he may be wrapped in a cold,

wet sheet, with a blanket outside, and left in it for an hour daily.

It will be well to give him twenty grains of bromide of soda at bedtime for the epileptic convulsions. It is not necessary to give it during the day, because his convulsions are almost entirely nocturnal. The bromide will have more effect if salt is largely eliminated from his diet. It will probably be necessary for him to take bromide for a long time, perhaps in considerably larger doses. In giving it, it must not be forgotten, however, that in childhood, bromide has a very depressing action both on the mind and body and that, unless used with discretion, it may do far more harm than good.

CASE 156. Mary B., two years old, was the second child of extremely neurotic parents. She had always been far ahead of her age in her mental development. She was not nursed but was fed during the first year on modified milk, prepared at home, and then on a very careful diet. She had always been very constipated and had had various laxatives, enemata and suppositories almost constantly since birth. Her digestion, except for occasional acute upsets, had been otherwise fairly good. She had had no other illnesses except two attacks of bronchitis and a mild attack of pyelitis. She sat up alone at eleven months and walked at twenty months. She cut her first tooth at ten months, but had eight when a year old.

She began to have convulsions when a year old. She almost always had one or two, and often as many as half a dozen, daily. The longest interval between convulsions during the year had been ten days. They almost always came on when she was angry, frightened or in pain. A fit of crying almost always ended in a convulsion. She would often have one if she was refused anything which she wanted. A fall or a bump was usually followed by one. She often had one during defecation, if the movement was hard. She was seen in one, which came on as the result of a rectal examination. She cried, held her breath and became a little blue. She then gave a short cry, stiffened out, raised her clenched hands before her face and then slowly dropped them. She was not cyanotic, breathed regularly during the attack, made no other movements, lost consciousness and passed both urine and feces. The attack did not last more than half a minute. She was dull and pale for several minutes after it. Her mother said that this was an unusually severe one and that many of them were merely slight " fainting spells." The attacks occurred more frequently when the bowels were not moving freely, when she was cutting teeth, when she was not kept free from excitement, and when she was below par physically. She had never had any definite attacks of laryngismus stridulus, and Trousseau's symptom and the facial phenomenon had been absent at repeated examinations.

Physical Examination. She was small but fairly nourished.

Her flesh was firm and her color good. Her mental development was nearer that of a child of three than of two years. The anterior fontanelle was not quite closed. There was no craniotabes. She had sixteen teeth. Her mouth and throat were normal and her tongue clean. There was no spasm or paralysis of any of the muscles controlled by the cranial nerves. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was just palpable in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent, as were Trousseau's sign and the facial phenomenon. There was no enlargement of the peripheral lymph nodes.

The urine was pale in color, acid in reaction and of a specific gravity of 1,015. It containd neither albumin nor sugar. The sediment showed nothing abnormal.

Diagnosis. The absence of Trousseau's symptom, the facial phenomenon and attacks of laryngismus stridulus shows that the convulsions are not manifestations of the spasmophilic diathesis (see Cases 100 and 164). The absence of spasm and paralysis, the normal condition of the reflexes, the absence of Kernig's and Babinski's signs and the normal mental development rule out any gross cerebral lesion. The diagnosis lies, therefore, between " idiopathic epilepsy " and reflex convulsions from slight causes in a child with an unusually irritable nervous organization. The character of the convulsions and their long continuance are in favor of epilepsy. The strongest point against it is the fact that the convulsions never occur without some definite cause. This fact, while it does not rule out epilepsy, is important enough to more than counterbalance the character and continuance of the convulsions and to make epilepsy very improbable. The chances are, therefore, against epilepsy and in favor of REFLEX CONVULSIONS. Time alone, however, can settle the diagnosis positively. If they persist after she grows older and can be better controlled, the diagnosis will have to be changed to epilepsy.

Prognosis. The convulsions will probably gradually

diminish in frequency and finally cease as she grows older and can be reasoned with and taught self-control.

Treatment. The treatment consists in regulation of her diet and bowels, and in training her in self-control. This will, however, be very difficult because crossing her is very likely to bring on a convulsion. She must be made to obey and to lead a normal life even if the number of convulsions is temporarily increased, as in this way only can she be controlled. Quiet surroundings and freedom from excitement are especially important in this connection. There is no direct indication for medicinal treatment. Everything which will tend to improve her physical condition is, of course, of importance. The most minute details of her life must be looked into and regulated.

CASE 157. Frances B., five years old, was the only child of neurotic parents, belonging to neurotic families. There had been no other pregnancies. She had always been perfectly well, except for occasional "colds" and an attack of pneumonia a few months before. She had, however, always been very excitable and unusually bright for her age. It was noticed when she was only a few months old that she often rubbed her legs together and appeared to enjoy it. A little later it was noticed that she would stop after a short time and perspire freely. The real significance of this was not appreciated, however, until she was about three years old. She had done it only when undressed and in bed up to a year before, since when she had also done it when up and dressed. She rubbed her legs together without any very wide motions and had perfectly definite orgasms with relaxation and perspiration. She had been reasoned with and mildly punished, but was apparently unable to control herself when left alone. There had been no increased frequency of micturition and no pain on micturition. No pin-worms had been seen on repeated examinations. Her hygienic surroundings, diet and care were ideal. She had been especially protected against overexcitement and overfatigue.

Physical Examination. She was well developed and nourished and of good color. In fact, she was the picture of health. She was very forward mentally, but did not appear unduly nervous or excitable. No adenoids were felt with the finger. Her tongue was clean, her teeth good and her throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm, paralysis or disturbance of sensation. The knee-jerks were equal and normal and there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The internal surfaces of the labiæ were slightly reddened. The prepuce was adherent to the clitoris, but there was no evidence of local irritation. There was no vaginal discharge.

The urine was pale, slightly acid in reaction, of a specific gravity of 1015 and contained no albumin or sugar.

Diagnosis. This habit, which is usually spoken of as masturbation, is better described by the term, PSEUDO-MASTURBATION, because, although it is sometimes associated, as in this instance, with a definite orgasm, it does not and cannot have at this age the same significance as in later childhood and adult life. At this time it is simply a habit, like picking the nose, indulged in because it is pleasant and without any definite purpose or sexual idea. Further evidence that this habit is not true masturbation is her good general condition and her normal intelligence, which show that neither her mental nor her physical development have been in any way affected by it. It is a habit that must be stopped, however, because, if it is not, it will, as she grows older, lead to true masturbation.

Prognosis. It will be unusually difficult to break up the habit in this instance, because it has persisted since early infancy and is increasing. She is, moreover, old enough to have a strong will of her own, but not old enough to have much moral sense or to be very successfully reasoned with. Her neurotic tendencies will make her harder to control, but, on the other hand, her mental forwardness will make it easier to reason with her.

Treatment. In the first place all sources of local irritation must be removed. The urine is normal and there are no pinworms in this instance. The slight irritation of the inner surfaces of the labiæ is probably an effect rather than a cause. It should, however, be treated with some simple salve, like boracic acid ointment. It will be wise to strip back the foreskin, under ether if necessary, and remove any smegma that may be present. Amputation of the clitoris, as is sometimes recommended, is absolutely unjustifiable. Her drawers and night clothes should be lined with linen, wherever they come in contact with the inner surface of the thighs and genitals. Nothing will be gained by punishment. It will be much more likely to make her tricky and deceitful than to stop the habit. She must be told not to do it, but told in the same way that she would be told to stop picking her nose or biting her nails. If it is spoken of as if it were some terrible thing or too much made of it, the result will be to

attract her attention to it and make her do it more. Great tact must be used in talking with her not to suggest the habit to her.

She must be watched constantly during the day, but in such a way that she does not realize that she is under surveillance. Someone must stay in the room with her, if she has a rest at noon. She must not be left alone at night until after she has gone to sleep. Someone must sleep in the room with her to prevent her from doing it when she wakes in the morning. If this plan is not feasible or sufficient, an apparatus consisting of an iron bar firmly attached to a band about each thigh, which will prevent her from rubbing her thighs together, may be applied.

CASE 158. Eva C. was the second child of healthy parents. Two other children were well. There had been no deaths or miscarriages. She was born at full term and was thought to have been normal at birth. A physician who saw her when she was eleven weeks old, because of a convulsion, told her parents, however, that her head was small. She had had repeated slight convulsions since that time, except when she was taking bromide. She was nursed for a year. Since then she had had only liquids, because she refused to chew or swallow anything solid. She had never had any disturbance of the digestion. She was very backward in every way. She sat up first at one year and cut her first tooth at the same time. She had never held things in her hands. Her parents thought that she noticed light, but nothing else. They were sure that she did not hear. She rolled her head from side to side constantly, except when she was asleep. She seldom cried. She was seen when seventeen months old.

Physical Examination. She was well developed and nourished, and of good color. The shape of her head was very peculiar, in that there was almost no occiput. The face and forehead were normal. The anterior fontanelle was closed. The occipito-frontal circumference of the head was 37.5 cm.; that of the chest at the level of the nipples, 46 cm. The average circumference of both at this age is about 46 cm.; that of the head being slightly the larger. The antero-posterior diameter of the head was 12 cm.; the lateral, 10 cm. The pupils were equal and reacted to light. She did not, however, notice anything, even light. The fundi showed nothing abnormal. She did not pay any attention to sounds. The mouth, throat and tongue were normal. She had three teeth. The thyroid was indistinctly palpable. She held her head up well, but sat up very unsteadily. There was no rosary. The heart, lungs and abdomen were normal. The lower border of the liver was palpable three cm. below the costal border in the nipple line. The spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. She would not hold anything in her hands, even when it was placed in them. Sensation to

touch and pain was normal. The skin was soft and there was no eruption or scars of old eruptions. Her hair was fine and thick. There was no enlargement of the peripheral lymph nodes.

Diagnosis. She is unquestionably a low-grade idiot. There are no signs of cretinism. The history is not that of amaurotic idiocy and the fundi are normal. The face is not of the Mongolian type. The head is not hydrocephalic, but is much smaller than normal. The diagnosis of MICROCEPHALIC IDIOCY is, therefore, without doubt, the correct one.

Prognosis. Very little improvement can be expected. She will always be a very low-grade idiot. The chances are, however, that she will not live to grow up, but will die of some intercurrent disease within the next one or two years.

Treatment. There is nothing to do for her except to feed her and keep her warm and clean. Craniectomy is a useless procedure, because the small size of the head is not due to a premature closing of the fontanelles and sutures, but to the small size of the brain. The mental defect is not caused by pressure of the bones on the brain, but is due to a congenital cerebral malformation. The fontanelles and sutures close early and the head is small because, on account of the small size of the brain, the intracranial pressure is not sufficient to keep the bones apart. She may be given five grains of the bromide of sodium from three to six times daily, if the convulsions persist and are severe.

CASE 159. Joseph C. was the first child of healthy Jewish parents. There had been no miscarriages. He was born at full term after a normal labor and was normal at birth, although very small. He was breast-fed entirely until he was eight and one-half months old, after which he was rationally fed. His digestion had always been good. He "acted just like any other baby" until he was three or four months old, smiled, took things in his hands, was interested in his surroundings and kicked out with his legs. He had not learned to hold up his head, however. He then ceased to develop mentally and soon began to deteriorate, so that when he was eight months old his parents were sure that he was "not bright." He became dull and stupid, did not notice, would not hold things in his hands and seldom moved. Rigidity of the extremities developed when he was fourteen months old, and twitching of the face when he was seventeen months old. He began to have convulsions a few days before he was seen, when eighteen months old. He had taken his food well up to a few days before, when he began to have difficulty in swallowing.

Physical Examination. He was fairly developed and nourished, but markedly pale. His head was of good shape and of normal size. The anterior fontanelle was 3 cm. in diameter and slightly depressed. There was no craniotabes. He was unable to hold up his head, which rolled limply from side to side. He heard but could not see. The pupils were equal and reacted to light. His expression was vacant. He kept his mouth open and drooled constantly. He had six teeth. The throat was normal and there were no adenoids. He could not sit up. The back showed a marked curve of weakness. There was a moderate rosary. The heart, lungs and abdomen were normal. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. He lay on his back and seldom moved, except to turn his head. He held his hands flexed at the wrists, with the fingers partially flexed. There was, however, very little resistance to passive extension of the fingers and hands. The arms dropped flaccidly when lifted up. He usually held his legs and feet extended. There was at times marked opposition to

passive motions; at others, the legs were perfectly flaccid. The knee-jerks were usually absent; when present, they were very feeble. The cremasteric and abdominal reflexes were present. There was no ankle clonus. Kernig's and Babinski's signs were absent. Sensation to both touch and pain was present. There was a slight general enlargement of the peripheral lymph nodes. There was no eruption and there were no scars of old eruptions. There were no mucous patches about the mouth or anus and no rhagades about the mouth. The rectal temperature was 99° F.; the pulse, 110; the respiration, 30. He weighed seventeen and one-half pounds.

The urine was high in color, acid in reaction and of a specific gravity of 1,024. It contained neither albumin nor sugar. The sediment showed an excess of urates, but no cells or casts.

Diagnosis. This boy is undoubtedly an idiot. His race, the normal condition at birth, the normal development for some months followed by progressive physical and mental deterioration, taken together with the general flaccidity and the blindness, form a combination so characteristic of AMAUROTIC IDIOCY that a positive diagnosis of this condition is justified without further examination. There is no other condition which shows just this combination of history and physical signs. The diagnosis should, however, be verified by an examination of the fundi which in this disease present a picture which is absolutely pathognomonic. This is a dark, reddish-brown, circular spot occupying the site of the macula lutea and surrounded by a whitish zone about twice the diameter of the optic disk. The eyes of this boy were examined and the characteristic picture found, thus verifying the diagnosis.

Prognosis. The prognosis is absolutely hopeless. If he is not fed with a tube, he will quickly starve to death. If he is fed with a tube, he may live for many months. Sooner or later, however, he will die of bronchopneumonia or some other intercurrent disease.

This disease is preëminently a familial one. The chances are, therefore, that if his parents have more children, some or all of them will be afflicted with the disease. They may, however, all escape.

Treatment. There is no treatment for this disease. Nothing can be done to relieve it or to shorten its course. It is not justifiable to let him die of starvation. He must be fed with a stomach tube, therefore, and taken care of until he dies.

CASE 160. Helen T.'s parents were feeble but not alcoholic or especially nervous. One other child was well. There had been no deaths or miscarriages.

She was born at full term after a normal labor, and seemed normal at birth. She had always been fed on condensed milk and recently had had crackers in addition. She had never been ill, except for a mild attack of diarrhea a month before. She had always been backward, but her parents had not thought much of it until she was sixteen months old. She had never learned to sit up alone and could say but one or two words. She was usually quiet and good-natured, but moaned occasionally. She was seen when two years old.

Physical Examination. She was fairly developed and nourished, but pale and flabby. Her expression was dull and stupid. She stared about without taking much notice, but could see and hear. She usually lay quietly, with the exception of coarse movements of her arms and fingers. She apparently amused herself by making a peculiar sucking noise and frequently made grimaces by putting out her tongue and rolling up her eyes. Her cry was hoarse but she said nothing. Her head was of good shape. The fontanelles were closed. The circumference of the head was 45 cm. (normal is 48 cm.); that of the chest, 43 cm. (normal is 51 cm.). Her hair was soft and fine. The palpebral openings were narrow and the eyes appeared deep-set. The outer canthi were slightly higher than the inner. The epicanthic folds were not marked. The pupils were equal and reacted to light. The nose was short and flat and wider than usual between the eyes. She had twelve teeth. Her tongue was somewhat enlarged, but moist and smooth. She kept it protruded beyond the lips most of the time. A moderate amount of adenoids was felt with the finger. The throat was otherwise normal. The neck was of normal length and there were no supraclavicular pads. The thyroid was of normal size. She was able to hold up her head, but not to sit alone. There was a marked curve of weakness. There was a slight rosary. The heart and lungs were normal. The abdomen was slightly enlarged, but otherwise normal. The liver and spleen were not palpable. The extremities were of normal

length, the distance from the anterior superior spine to the sole being forty-six per cent of the total length. The epiphyses at the ankles were slightly enlarged. The hands were of good shape, except that the little fingers curved in rather more than usual. She had no idea of standing up or what her legs were for. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The skin was normal.

The urine was cloudy, straw-colored, acid in reaction, and contained neither albumin nor sugar. The sediment consisted of amorphous phosphates.

BLOOD.

Hemoglobin,	70%
Red corpuscles,	5,192,000
White corpuscles,	12,400

Diagnosis. This child is, of course, an idiot. The history and the fact that she sees rule out amaurotic idiocy. The normal size and shape of the head exclude hydrocephalic and microcephalic idiocy. The absence of spasm, paralysis and exaggerated reflexes shows that there is no gross cerebral lesion, either congenital or as the result of hemorrhage at birth. The enlargement and protrusion of the tongue and the expression of the face suggest cretinism to a certain extent. This can be excluded, however, on the fineness of the hair, the normal condition of the skin, the absence of supraclavicular pads, the normal length of the neck and of the extremities and the normal shape of the hands and feet. There are many points about the physical examination which are in favor of the Mongolian type of idiocy. These are the hoarse cry, the narrow palpebral openings, the obliqueness of the eyes, the distance between the eyes, the short and flat nose, the enlargement of the tongue and the incurvation of the little fingers. The incurvation of the little fingers is so common however, even in normal persons, that it is of little importance. It is true that the back of the head is of good shape, that the epicanthic folds are not marked, that the angle of the eye is but very little increased and that the tongue is not dry and

fissured. Marked changes in the tongue almost never develop as early as two years, however, and the head is not always flattened anteroposteriorly in Mongolian idiocy. The angle of the eyes and the development of the epicanthic folds are merely questions of degree. The diagnosis of MONGOLIAN IDIOCY is, therefore, justified.

Prognosis. Mongolian idiots are extremely susceptible to infection and resist disease very badly. She will probably, therefore, not live many years. There is no prospect that she will become a useful member of society or able to support herself. She will probably be able to walk and can probably be taught to feed herself and be cleanly in her habits. Little more than this can be expected.

Treatment. She should be placed in some institution for the feeble-minded, because children are better taught and better cared for in such institutions than at home and because, when in an institution, they do not serve as bad examples to other children.

JOSEPH C. Case 159.

HELEN T. Case 160.

CASE 161. John D. was the eighth child of healthy parents. There had been no deaths or miscarriages. He was born at full term after a very difficult labor in which his head was much bruised and the left clavicle broken. His head was much misshapen at birth, but when he was a month old seemed perfectly normal. His mother noticed when he was two months old that his head was becoming larger. She thought that it had increased in size very rapidly during the last week. When he was two and one-half months old she noticed that the eyes "dropped down" and that he did not close the lids when he was asleep. She said that he moved his extremities normally, but that he was quieter than her other babies had been. He rarely cried and took but little notice. In fact, she was not sure that he could see. He was entirely breast-fed, had had no disturbance of digestion and had gained steadily in weight. He was seen in consultation when three months old.

Physical Examination. He was well developed and nourished and of good color. The head was much and symmetrically enlarged. The anterior fontanelle was six cm. in diameter and bulging, while the posterior fontanelle was two cm. in diameter. The saggital, coronal, frontal and lambdoid sutures were open. The occipito-frontal circumference of the head was forty-six cm. (average is 39.5 cm.). The superficial veins of the scalp were much enlarged. The forehead was very prominent and the face appeared small. He could not close his eyelids and a quarter of an inch of conjunctiva was visible above the iris when the eyes were open. The pupils were equal and reacted to light. He both saw and heard. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. There was no nasal discharge and he kept his mouth shut. The heart, lungs, abdomen and genitals were normal. There was no rosary. The circumference of the chest at the nipples was thirty-nine cm. (average is 38 cm.). The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no

enlargement of the peripheral lymph nodes. There was no eruption and there were no scars of any old eruption. There were no mucous patches or rhagades about the mouth or anus.

Diagnosis. There can be no doubt, of course, that the trouble is CONGENITAL CHRONIC INTERNAL HYDROCEPHALUS. Rachitic enlargement of the head, the only condition with which it could be confused, can be excluded on the age of the baby, the symmetry of the head, the bulging of the fontanelle, the open sutures, the enlargement of the veins of the scalp, the pushing down of the eyes and the absence of all other signs of rickets. The absence of spasm, paralysis, exaggeration of the deep reflexes and Kernig's sign is presumably due to the relatively slow accumulation of the fluid, the brain having had time to accommodate itself to the gradual increase in the pressure. Syphilis can be excluded as the cause of the hydrocephalus in this instance on the good family history and the absence of all signs of syphilis. The etiology is, therefore, as in most such cases, entirely obscure.

Prognosis. The prognosis is practically hopeless. The head will almost certainly increase steadily in size and death ensue in a few months. It is barely possible, however, that the process will, after a time, cease. If it does, he will in all probability be more or less deficient mentally and probably be partially paralyzed. There is a small chance, however, that he may be normal both mentally and physically, except for a large head. There is no possibility of a diminution in the size of the head, even if the process ceases and he survives.

Treatment. It being possible to exclude syphilis as the etiological factor in this case, nothing whatever can be accomplished by medicinal treatment. The removal of the fluid by lumbar puncture or by tapping the lateral ventricles is a useless procedure, because it does not remove the cause of the trouble and the fluid consequently quickly reaccumulates. The injection of astringent solutions into the lateral ventricles is open to the same objection. Draining the cerebrospinal fluid into the peritoneal cavity through a trephine opening in a lumbar vertebra is a simple operation and temporarily effective. Unfortunately, the opening is

always soon closed by adhesions or the overgrowth of granulation tissue, even when a silver tube is used. Various operations, the object of which is to drain the fluid from the lateral ventricles into the subarachnoid space, one of the cerebral sinuses or a vein in the neck, are possible. They are all open to the same objection and that is, that unless the connection is made through some normal channel, like a transplanted vein or artery, Nature quickly heals the wound and stops the drainage. If a transplanted vessel is used to make the connection there is, however, a reasonable chance of permanent cure. All these operations are, of course, extremely dangerous. This baby can see and hear, and has no spasm or paralysis. If the process can be stopped now and further increase of intracranial pressure prevented, he will almost certainly develop normally both physically and mentally. He is in good general condition and a good operative risk. He is practically certain to die if he is not operated upon or, if he does not, to be a paralytic imbecile. It seems justifiable, therefore, to advise an operation for permanent drainage through a transplanted vessel, provided a surgeon competent to perform the operation is available, although the chances are that he will die during or as the result of the operation.

CASE 162. Joseph K. was the second child of healthy parents. The other child was well and there had been no miscarriages. He was born at full term, after a normal labor, and was normal at birth. He was breast-fed, gained rapidly in weight and developed normally until he was nine months old, when he had an attack of cerebrospinal meningitis. The parents thought that he had been blind and deaf since this illness, and had noticed that his head had increased rapidly in size during the past month. He took the breast well and had no disturbance of digestion. He was brought to the Infants' Hospital, when he was eleven months old, because of the blindness, deafness and enlargement of the head.

Physical Examination. He was well developed and nourished and of fair color. His head was somewhat enlarged, the occipito-frontal circumference being forty-eight cm. (average is 45 cm.). The enlargement was symmetrical. The anterior fontanelle was four and one-half cm. in diameter and bulging. The posterior fontanelle and sutures were closed. He was able to hold up his head, but rather feebly. He could not sit alone. The conjunctivæ were not visible above the irides. The pupils were equal and reacted to light. He could not see and probably could not hear. The fundi were normal. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. He had six teeth. There was no rigidity of the neck and no neck sign. There was a very slight rosary. The circumference of the chest at the nipples was forty-four cm. (average is 45 cm.). The heart, lungs, abdomen and genitals were normal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no paralysis of the extremities, but there was a little spasm in the legs. There was a tendency to keep the legs crossed. The knee-jerks were equal, but much exaggerated. There was at times a marked ankle clonus on the right. Kernig's sign was marked on the right, slight on the left. There was no enlargement of the superficial lymph nodes. The rectal temperature was 98.6° F.; the pulse, 120; the respiration, 30.

Lumbar puncture was done and forty cc. of perfectly clear fluid under somewhat increased pressure allowed to run off. The level of the fontanelle was then that of the surrounding bones. This fluid contained about $\frac{1}{12}\%$ of albumin and did not deposit a fibrin clot.

Diagnosis. The enlargement of the head and the bulging of the anterior fontanelle show that there is an increase in the intracranial pressure. This is proved by the fact that when lumbar puncture was done the cerebrospinal fluid ran off under increased pressure. The absence of changes in the optic nerves, the normal position of the eyes and the closed sutures show that this pressure is not extreme. The fact that the sutures are closed is of comparatively little importance, however, because they are often fairly firmly united at nine months. When it is taken into consideration that this increased cerebral pressure followed an attack of cerebrospinal meningitis, there can be no doubt that it is due to an ACQUIRED INTERNAL HYDROCEPHALUS as the result of this disease. The hydrocephalus in this instance cannot be due to obstruction of any of the foramina, because the fluid ran off freely on lumbar puncture. It must be due, therefore, either to some obstruction to the veins of Galen or to some pathological change in the choroid plexus. The absence of a fibrin clot and of an increased percentage of albumin in the cerebrospinal fluid shows that there is no inflammation at present. The increase in the cerebral pressure does not seem sufficient to account for the blindness and probable deafness. These are almost certainly due to degenerative changes in the nerves resulting from the cerebrospinal meningitis. The spasm of the legs, the tendency to keep the legs crossed, the exaggeration of the knee-jerks, the ankle clonus and the Kernig's sign may be due to cerebral irritation from the increased intracranial pressure, but are more probably due to meningeal or cortical changes caused by the meningitis.

Prognosis. The blindness and deafness are, of course, irremediable. The spasm of the extremities, being in all probability due to lesions of the cortex or meninges, will persist. These lesions are very likely, moreover, to be the cause of convulsions in the future. There is a reasonable

chance that the hydrocephalus may not increase or may, perhaps, even diminish, as the result of the absorption or contraction of the inflammatory tissue which is causing the obstruction to the circulation.

Treatment. There is no medicinal treatment which can hasten the resolution of the newly formed tissue, which is the cause of the hydrocephalus. It is possible, however, that the withdrawal of the fluid by lumbar puncture may, by diminishing the intracranial pressure, favor resolution. It seems rational, therefore, to do this and to repeat the operation as often as is necessary to keep down the pressure. If there is no improvement after repeated punctures it will then be time to consider the advisability of some operation to establish permanent drainage (see Case 161). It seems hardly worth while to attempt this, however, when it is taken into consideration that the baby is blind and deaf and has a spastic paraplegia.

Hydrocephalus.

Deformity of head and chest in Rickets.

CASE 163. Marion S. was the first child of young and unusually vigorous parents. There had been no previous miscarriages. She was delivered at full term by low forceps and weighed six and one-half pounds. She was very feeble at first, but rallied after twenty-four hours. The breast-milk gave out after three days and she was given a strong modified milk. She did not vomit, but the bowels were constipated and she did not gain in weight. She began to vomit, however, when four weeks old. The vomiting was at first more like regurgitation and always occurred in the first hour after feeding. A wet-nurse was procured two days later. She would not take the breast and consequently was given two ounces of breast-milk with one teaspoonful of water every two and one-half hours. The vomiting continued, nevertheless, soon became explosive in character, and was at times apparently accompanied by pain. The constipation became more marked, movements being obtained only by enemata. These were very small, brownish-green in color and sticky in consistency. She had had only whey and water during the last twenty-four hours. The water had been retained; the whey, however, had been vomited immediately or, if not, retained for two or three feedings and then vomited. She had lost weight and strength very rapidly during the last week. The physician who had had charge of the baby up to twenty-four hours before she was seen in consultation, when six weeks old, had said that she was normal at birth, and had either not noticed or had not said anything about the condition of the fontanelle. The mother, however, thought that the fontanelle had always been a little full. Divergent strabismus was noticed the day before she was seen.

Physical Examination. She was small and thin, but of fair color. She was evidently uncomfortable and cried out frequently. Her condition was so serious that careful measurements of the head and chest were not made. The head was, however, large when compared with the chest. The enlargement was symmetrical. The forehead was somewhat prominent. The anterior fontanelle was about four cm. in diameter and bulging. The posterior and lateral fontanelles were open, the posterior fontanelle being two cm. in diam-

eter. The sagittal, coronal, frontal and lambdoid sutures were open. The conjunctivæ were not visible above the irides and the eyelids closed normally. There was no strabismus. The pupils were equal and reacted to light. There was no nasal discharge. There was no rigidity of the neck or neck sign. The heart and lungs were normal. The level of the abdomen was that of the thorax. There was no visible peristalsis over the stomach, and no tumor in the region of the pylorus was felt. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal, but exaggerated. There was a slight Kernig's sign on both sides. There was no enlargement of the peripheral lymph nodes. There was no eruption and there were no scars of old eruptions. There were no mucous patches about the mouth or anus. The rectal temperature was 98° F.; the pulse, 140; the respiration, 25. She weighed five pounds.

Diagnosis. The vomiting, constipation and loss of weight seem at first to point directly to some disease of the stomach. The explosive character of the vomiting, the fact that the vomiting has increased in spite of the change to human milk and the meconium-like stools suggest that it is stenosis of the pylorus. The divergent strabismus and the fullness of the fontanelle point, however, to some trouble in the head. When this possibility is taken into consideration, it is evident that the continued vomiting and its explosive character may be equally well explained by an increase in the intracranial pressure. The symmetrical increase in the size of the head, the prominence of the forehead, the open fontanelles and sutures and the bulging of the anterior fontanelle are all evidences of an increase in the intracranial pressure. The only chronic condition which can cause such a marked increase in pressure at this age is CONGENITAL INTERNAL HYDROCEPHALUS. The exaggeration of the knee-jerks and the positive Kernig's sign are further evidences of cerebral disease. The evidence in favor of the brain as the location of the trouble is so strong that it hardly seems necessary to mention that the absence of visible gastric peristalsis and of

a palpable tumor at the pylorus counts very strongly against stenosis of the pylorus. Syphilis can be excluded as the cause of the hydrocephalus in this instance on the good family history, the fact that the baby was born at full term and the absence of all signs of syphilis. The etiology is, therefore, as in most such cases, entirely obscure.

Prognosis. The prognosis is practically hopeless. The increase in the intracranial pressure will almost certainly continue and the head steadily increase in size. She will probably not live more than a few days, or at most a few weeks. It is barely possible, however, that the pressure will after a time cease. If it does, she will, in all probability, be more or less deficient mentally and partially paralyzed.

Treatment. It being possible to exclude syphilis as the etiological factor in this instance, nothing whatever can be accomplished by medicinal treatment. The various operative procedures which may be employed in the treatment of chronic internal hydrocephalus are described in Case 161. It is obvious that the baby's general condition is at present too poor to warrant any serious operation. Lumbar puncture ought to be done, however, to diminish the intracranial pressure. It is not likely to do any permanent good, but will almost certainly diminish the discomfort and perhaps stop the vomiting. It may be repeated as often as is necessary to keep down the intracranial pressure. She should be given half an ounce of whey every hour. If this is retained, human milk, with 25% of lime water, half an ounce to one ounce every two hours, should be tried.

CASE 164. Jacob A. was the child of healthy parents. One other child was well, two had died of "summer complaint" and three of diphtheria. There had been no miscarriages.

He was fed from birth on a mixture of three parts of whole milk and one of water. When five months old he was given tea and crackers, and probably other things also, in addition. He had always done well, had not vomited and had had normal movements. He began to cry almost constantly October 20. Swelling of the arms and legs appeared at the same time. He was seen October 22, when ten months old.

Physical Examination. He was well developed and nourished, but rather pale. He was perfectly conscious. The parietal and frontal eminences were moderately enlarged, and the head was somewhat flattened on top. The anterior fontanelle was 4 cm. in diameter and level. The pupils were equal and reacted to light. There was no craniotabes. He had two teeth. The gums, mouth and throat were normal. The tongue was clean. The ear-drums were normal. There was a moderate rosary. The heart and lungs were normal. The level of the abdomen was somewhat below that of the thorax, but nothing abnormal was detected in it. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The epiphyses at the wrists were slightly enlarged. There was a rather tense swelling of the feet and legs half-way to the knees, and of the hands and lower halves of the forearms. This swelling was not hot, tender or red. It did not pit on pressure. He held his arms partly flexed at the elbows and at the wrists. The hands were turned a little to the ulnar side. The fingers and thumbs were flexed sharply at the metacarpo-phalangeal joints and extended at the phalangeal joints, the thumb being inside the fingers. The legs were held partially flexed at the knees and partially extended at the ankles, with flexion of the toes at the metatarso-phalangeal and extension at the phalangeal joints. Any attempt to overcome the spasm in the arms and legs caused much pain. The knee-jerks could not be tested because of the spasm. Kernig's sign was absent. The facial phenomenon was absent. Trousseau's symptom could not

be tested because of the spasm. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was 101° F., the pulse 110, the respiration 40. A few minutes after the examination he became entirely relaxed. The spasm returned again, however, in a short time.

The urine was pale, clear, acid in reaction, of a specific gravity of 1,010, and contained neither albumin nor sugar.

Diagnosis. Tetanus can be ruled out on the absence of trismus and the characteristic position of the extremities. Meningitis can be excluded on the normal mental state, the level fontanelle, the absence of involvement of the cranial nerves and of rigidity of the neck and the characteristic position of the extremities. The age of the baby, the good general condition, the intermittence of the paroxysms, the pain in association with them and the swelling of the extremities are all characteristic of tetany. The position of the extremities during the spasm is pathognomonic of TETANY and makes the diagnosis positive. The swelling of the extremities is undoubtedly nervous in origin and belongs in the class of the angioneurotic edemas. The enlargement of the frontal and parietal eminences, the flattening of the top of the head, the rosary and the enlargement of the epiphyses at the wrists are signs of rickets, as is probably the delayed dentition.

Tetany is not properly a disease but merely a manifestation of the spasmophilic diathesis. In this condition there is a marked increase in the nervous excitability, which shows itself in various ways, the most characteristic manifestations being laryngismus stridulus, tetany and convulsions. The spasmophilic diathesis is almost certainly due to some disturbance in the metabolism of calcium. It is uncertain whether this disturbance is or is not due to parathyroid insufficiency. There is in all probability a deficiency of calcium salts in the blood in the spasmophilic diathesis. His diet, which has been largely made up of cow's milk has never been deficient in calcium. The calcium in cow's milk is, however, not nearly as well utilized as that in human milk, so that he may well not have absorbed a sufficient amount. The rickets is, therefore, merely another manifestation of

disturbance of nutrition and not the cause of the paroxysmal contractions.

Prognosis. The prognosis depends very largely on whether or not he can get the best treatment. If he can, the paroxysms will quickly cease. If he cannot, they will probably continue and other manifestations of the spasmophilic diathesis are very likely to develop. There is no danger of death in a paroxysm of tetany, but he may die in an attack of laryngismus stridulus or during a convulsion.

Treatment. No treatment is necessary for the paroxysms unless they are more severe than at present. A bath at 110° F. is the best treatment. If the attacks become more severe, they can be controlled to a certain extent by bromide of sodium or potassium, in doses of from three to five grains, in an aqueous solution, given three or four times daily. The attacks will be less likely to develop if he is kept quiet and not disturbed.

The treatment of the spasmophilic diathesis consists in regulation of the diet. Human milk always quickly relieves this condition. A purely carbohydrate diet relieves it, but much less promptly and is, moreover, unsuitable for a baby of this age. A return to cow's milk in any form, at any rate until a considerable time has elapsed, almost invariably causes a return of the symptoms. The only rational food for this baby is, therefore, human milk. If he cannot get it, he must be given a starch and sugar solution for as long a time as is possible, due regard being paid to his general condition, and then gradually worked on to some modification of cow's milk.

It is possible that the administration of some of the calcium salts, like the lactate, might do good, but the indications are so doubtful and the results to be expected so slight compared to those obtained with human milk that they are hardly worthy of consideration. Parathyroid extract, in doses of one-quarter of a grain, three times a day, would seem a more rational treatment, but has not been used enough to prove whether or not it is of any value.

CASE 165. Baby T. was born at full term after a normal first pregnancy. The membranes ruptured January 11 and much liquor amnii drained away. Labor began the afternoon of January 12. The pains were hard, but very little progress was made. He was finally delivered by high forceps, after a manual dilatation, at 3 A.M., January 13. The operation was an easy one and did not take over an hour. The head was considerably compressed at birth but the fontanelles did not bulge. He weighed six and one-half pounds and seemed all right in every way. He cried normally and passed both urine and feces. He was not put to the breast but took water well.

He suddenly stopped breathing and became deeply cyanotic at 8 P.M., January 13, seventeen hours after birth. He was brought around by artificial respiration, but had another similar attack about 9 P.M., which also required artificial respiration. He had breathed quietly and normally since then, but had not moved much and had not opened his eyes. A little twitching of the face was noticed during the morning of the 14th, and during the afternoon he moved his left arm constantly, but had no rigidity or convulsions. He took a little sugar and water during the day and passed both urine and feces. He became more stupid during the evening and could not be made to swallow. The pulse gradually fell during the day from 160 to 120. The rectal temperature varied between 99° F. and 99.5° F. He was seen in consultation at 10.30 P.M., January 14.

Physical Examination. He was well developed and nourished, and of good color. He could not be roused or made to move. His neck was flaccid. The head was of good shape and of normal size. The anterior fontanelle was 3 cm. and the posterior fontanelle 2 cm. in diameter. Both bulged a little. The sagittal and coronal sutures were $1\frac{1}{2}$ cm. wide and a little full; the other sutures were closed. The axes of the eyes were parallel. The pupils were a little smaller than a pinhead and did not react to light. A little dried blood was seen high up in the nostrils. The mouth and throat were normal. There was no facial paralysis and no marks of the forceps. The heart, lungs and abdomen were normal. The cord was healthy. The liver was palpable 1 cm. below the

costal border in the nipple line. The spleen was not palpable. The arms were held slightly flexed at the elbows and the hands were clenched. The spasm was, however, very easily overcome. There was no spasm of the legs. The knee-jerks were not obtained. There was no Kernig's sign. The rectal temperature was 99.5° F., the pulse 140, the respiration 24.

Diagnosis. The diagnosis lies between some cerebral lesion, intestinal toxemia and sepsis. The facts that he has had no food, that his bowels have moved freely and that his temperature is practically normal are sufficient, in connection with the positive signs of cerebral trouble, to exclude intestinal toxemia. The normal condition of the cord, the normal temperature and the absence of any local manifestations of sepsis rule out sepsis.

The age, lack of exposure and normal temperature exclude meningitis. The bulging of the fontanelles and sutures shows positively that there is an increase in the cerebral pressure. This was not present at birth. An internal hydrocephalus could hardly have developed in seventeen hours. Serous meningitis does not develop without a cause and is usually accompanied by fever. The only reasonable explanation for the increased cerebral pressure is, therefore, a hemorrhage. The gradual development of the symptoms of increased cerebral pressure is perfectly consistent with a slow capillary oozing, which is the usual form of hemorrhage occurring at or soon after birth. The presence of blood high up in the nostrils is almost pathognomonic of cerebral hemorhage, the blood coming through the cribriform plate. The diagnosis of CEREBRAL HEMORRHAGE is, therefore, justified. The diagnosis is so certain that it hardly seems necessary to do a lumbar puncture to confirm it. The spinal fluid does not always contain blood, moreover, when there is a cerebral hemorrhage, and the presence of blood does not always indicate cerebral hemorrhage, because it may be due to the wounding of some vessel during the puncture. The fact that the involuntary motions were confined to the left arm suggests that the hemorrhage is greater on the right than on the left side of the brain. This point is not of much importance, however, because, owing to the imperfect development of

the cortical centers and the general nervous excitability at this age, no very definite conclusions can be drawn from what would be important localizing symptoms in an older child or an adult.

Prognosis. He is almost certain to die if he is not operated upon. If he does not die, he will surely be paralyzed and probably feeble-minded. He will probably die during or soon after the operation. If he does not, he may still be paralyzed, but the paralysis will be less extensive than it will be if he is not operated upon. There is a reasonable chance, however, that the operation will relieve the symptoms and that he will develop normally.

Treatment. He should be operated on immediately. Delay will mean still further hemorrhage and more pressure on and damage to the brain.

CASE 166. Elsie L., two and one-fourth years old, was the first child of healthy parents. There had been no miscarriages. She was born after a very difficult instrumental vertex delivery at the end of a long labor and was almost dead at birth. She was not nursed, as she was too weak to take the breast. She did not thrive during infancy, but since then her general condition had been good. She had had no convulsions. She sat up alone at nine months and cut her first tooth at a year. She began to stand at sixteen months, but did not begin to walk at all until she was twenty-six months old. Her gait was then noticed to be very peculiar. She was brought because she did not walk well. She used her hands well, talked early and was bright mentally. She controlled the sphincters of the bladder and anus.

Physical Examination. She was well developed and nourished and of good color. Her tongue was clean and her mouth and throat normal. There was no rosary. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. She talked well for a child of her age and seemed bright. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. There was no deformity of the spine, and it was normally flexible. There was no paralysis or spasm of the arms, and the reflexes of the arms were normal. She stood with her knees close together, her body flexed on the thighs, the knees partially flexed and the heels a little off the ground. When she walked the knees rubbed together and one leg crossed in front of the other. When lying down the legs could be straightened on the thighs and the feet brought to a right angle, but with some little difficulty. Separation of the legs was resisted and was impossible to more than a moderate extent. There was decided resistance to hyperextension of the thighs. The knee-jerks were equal, but much exaggerated. There was no ankle clonus. The sensation was normal. The legs were warm, of good color and not wasted. Kernig's sign was absent. Babinski's phenomenon was present on both sides. There was no enlargement of the peripheral lymph nodes.

Diagnosis. This little girl has a paraplegia with spasm. The spasm, exaggeration of the reflexes and normal sensation

rule out any lesion of the peripheral nerves. The spasm, exaggeration of the reflexes and absence of wasting rule out a lesion of the anterior horns, such as occurs in anterior poliomyelitis. Transverse myelitis, except from disease of the spine, almost never occurs at this age. There is no deformity of the spine in this instance and it is normally flexible. Transverse myelitis from other causes can be excluded on its rarity at this age and the absence of loss of control of the sphincters and of disturbance of sensation. The lesion must, therefore, be in the brain. It is hard to conceive of a lesion anywhere in the brain which would cause a spastic paraplegia without other symptoms, except in the cortex. A lesion of the cortex in the region of the upper portion of the post-central convolution on both sides of the longitudinal fissure would cause just such a combination. Such a lesion in an infant is usually a congenital defect or the result of a subdural hemorrhage at birth. The long, hard labor, which is the usual cause of such hemorrhages at birth, and her feeble condition after birth, make it almost certain that in this instance the lesion is due to a hemorrhage at birth. The diagnosis of CEREBRAL PARALYSIS resulting from a subdural hemorrhage at birth is, therefore, justified.

Prognosis. There will be no extension of the paralysis and her mental development will be normal. There will be no spontaneous improvement in the condition of the legs. Much improvement in her walking can be expected, however, from suitable operations and apparatus.

Treatment. Electricity and massage are useless in this condition because there is no disturbance of the nutrition of the muscles. It is probable that passive motions, if thoroughly carried out, will prevent further contractures, but it is very doubtful if they will diminish those now present. Proper operative procedures, perhaps followed by the application of apparatus, ought to improve the position of her legs and make walking much easier. Resection of the posterior nerve roots, recently recommended for the relief of this condition, has not as yet been tried out thoroughly enough to justify its use, except as a last resort. She should be placed in the hands of an orthopedic surgeon for treatment.

CASE 167. John J., nine months old, was the third child of healthy parents. There had been no deaths or miscarriages. There was no tuberculosis in either family and there had been no known exposure to it. He had been well, although bottle-fed, up to May 7, when he became feverish and began to cough. There was much mucus in his throat. A physician who saw him at the time said that he had bronchopneumonia. The cough and fever diminished after a few days. He had several convulsions May 15, which were followed by marked rigidity and almost constant twitching. He became drowsy and refused to take his food. He did not vomit and was not constipated. He was admitted to the Infants' Hospital, May 16.

Physical Examination. He was well developed and nourished and of good color. He was unconscious, but made frequent involuntary motions. The anterior fontanelle was three cm. in diameter and level. There was no rigidity of the neck. The neck sign could not be determined, because of the constant motion of the legs. The pupils were equal and somewhat dilated. They reacted feebly to light. The throat was slightly reddened, but otherwise normal. The ear-drums were normal. The heart was normal. The lungs were normal, except for an occasional moist râle in both lower backs. The abdomen showed nothing abnormal. The lower border of the liver was palpable one cm. below the costal border in the nipple line. The spleen was not palpable. There was slight spasm of the extremities, but no paralysis. The knee-jerks could not be determined, because of the continuous motion. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 102.6° F.; the pulse, 140; the respiration, 50.

The urine was clear, acid in reaction and contained no albumin.

The leucocytes numbered 8,400.

Diagnosis. The signs in the lungs are not sufficient to account for his condition. The unconsciousness, the dilated and feebly reacting pupils and the spasm of the extremities, together with the absence of signs of disease elsewhere, show that, in spite of the fact that there is no bulging of the anterior

fontanelle, the disease is in all probability located in the head. The absence of rigidity of the neck and of Kernig's sign count less against it than does the absence of bulging of the anterior fontanelle. If the disease is located in the head, it is presumably some form of meningitis. The absence of leucocytosis counts strongly against all forms of meningitis, except the tubercular and the influenzal. The onset of the symptoms in the course of a catarrhal process in the throat and of bronchitis suggests that the trouble may be influenzal. This is a relatively rare condition, however, while tubercular meningitis is very common. The chances are, therefore, in favor of tubercular meningitis. The diagnosis can be made, however, only by lumbar puncture.

Lumbar puncture was done and three cc. of very turbid fluid, under low pressure, were obtained. This fluid contained a large number of cells, 98% of which were polynuclear and 2% mononuclear. It also contained very many slender, Gram-negative bacilli, which stained deeply at the poles. The vast majority of these bacilli were outside of the cells.

The characteristics of this fluid are the same as those of the cerebrospinal fluid in influenza meningitis, and the characteristics of the bacilli correspond in every way to those of the influenza bacillus. There can be no doubt, therefore, as to the diagnosis of INFLUENZA MENINGITIS.

Prognosis. The prognosis is practically hopeless. The course is almost invariably short in this form of meningitis. He will probably not live more than four or five days.

Treatment. The treatment can be only symptomatic.

CASE 168. Mary J., five months old, was the only child of healthy parents. She was breast-fed and had always been well. She was taken suddenly sick, April 6, with convulsions, high fever, cough and labored breathing. She did not vomit. The bowels moved twice daily and the stools were normal. The cough, fever and labored breathing continued. She was admitted to the Infants' Hospital, April 9.

Physical Examination. She was well developed and nourished, but moderately pale. She was stupid, but nursed fairly well. The respiration was grunting and accompanied by motion of the alæ nasi. The anterior fontanelle was three cm. in diameter and level. There was no rigidity of the neck or neck sign. The pupils were equal and reacted to light. The ear-drums were normal. Nothing abnormal was detected in the chest. The abdomen showed nothing abnormal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. There was no paralysis, but slight twitching and rigidity of the extremities. The knee-jerks were equal and exaggerated. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 104° F.; the pulse, 180; the respiration, 40.

The urine was pale, slightly acid in reaction and contained a slight trace of albumin. The centrifugalized sediment showed only a few small and large round cells.

The leucocytes numbered 48,000.

Diagnosis. The sudden onset, the continued high temperature, the cough, the grunting respiration, the motion of the alæ nasi and the leucocytosis are very characteristic of lobar pneumonia. The convulsions at the onset, the stupor and the slight twitching and rigidity of the extremities are not inconsistent with it. The absence of physical signs of pneumonia does not exclude it, because it is not uncommon to find no physical signs for several days after the onset in pneumonia at this age. The fact that the rate of the respiration is not increased as much as that of the pulse suggests, however, that, in spite of the signs pointing to pneumonia, this may really not be the trouble, because the rate of the respiration is almost invariably increased out of proportion

to that of the pulse in this disease. The knee-jerks are, moreover, usually normal or diminished in pneumonia, not exaggerated, as in this instance. The convulsions at the onset, the stupor, the twitching and rigidity of the extremities and the exaggeration of the knee-jerks are all suggestive of some cerebral disease, either meningitis or encephalitis. They are suggestive enough to justify, or rather to demand, a lumbar puncture, because if there is a meningitis it is, judging from the acuteness of the onset and the leucocytosis, probably not tubercular but meningococcal.

Lumbar puncture was done and five cc. of very turbid fluid, under low pressure, were obtained. This fluid deposited a fibrin clot, but remained cloudy. A smear showed 95% of polynuclear and 5% of mononuclear cells. Very many Gram-staining diplococci were found, both within and without the cells. They were surrounded by a capsule, were pointed at the ends and showed a tendency to form chains. No cultures were made.

There is, therefore, a MENINGITIS. It is, however, not due to the meningococcus, as was suspected, but to the PNEUMOCOCCUS. The turbid fluid and the large excess of polynuclear cells are characteristic of this form of meningitis. Pneumococcus meningitis is very seldom a primary condition, but usually merely one of the manifestations of a general pneumococcus infection. It is very probable, therefore, that pneumonia may also develop in a few days.

Prognosis. The prognosis is practically hopeless, as pneumococcus meningitis is almost invariably fatal. The course is usually short. She will almost certainly not live more than a week, probably less.

Treatment. The treatment can be only symptomatic.

CASE 169. Frank F., eleven months old, was the only child of healthy parents. He was nursed and had always been perfectly well. He was taken suddenly ill with pneumonia of the right lower lobe, January 10. The temperature ran between 103.5° F. and 104.5° F., his pulse between 140 and 160, and his respiration about 60. He was quiet, but clear mentally, was able to nurse and had no disturbance of the digestion. He became very restless, January 16, and retraction of the neck and rigidity of the extremities developed. He also had clonic spasms of the extremities from time to time. There was no change in the temperature, pulse and respiration. He was seen at the Infants' Hospital, January 17.

Physical Examination. He was well developed and nourished. The cheeks were flushed and there was a tinge of cyanosis about the mouth. The respiration was grunting and the alæ nasi moved with it. The neck was rigid and there was moderate opisthotonos. The neck sign could not be determined because of the rigidity of the neck. The anterior fontanelle was three cm. in diameter and bulged markedly. The membranæ tympanorum were normal. There was bilateral internal strabismus. The right pupil was much dilated and neither reacted to light. He did not notice. There was no rosary. The heart was normal, except that the second sound at the pulmonic area was accentuated. There was flatness, loud bronchial respiration, increased vocal resonance and tactile fremitus, with an occasional high-pitched, moist râle, over the right lower lobe. The rest of the lungs was normal. The abdomen was normal. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. There was constant twitching of the extremities, which were rigid. The knee-jerks were equal and much exaggerated. Kernig's sign could not be determined, because of the rigidity. The superficial lymph nodes were not palpable and there was no evidence of enlargement of the bronchial lymph nodes. The rectal temperature was 104.6° F.; the pulse, 180; the respiration, 64.

The urine was high in color, acid in reaction, of a specific gravity of 1,020 and contained no albumin.

The leucocytes numbered 36,000.

Lumbar puncture was done and sixty cc. of clear fluid, under very high pressure, were allowed to run off. This fluid contained but six cells to the cubic millimeter and did not deposit a fibrin clot on standing. No organisms were found in the fluid and cultures from it were sterile.

Diagnosis. The sudden onset of the symptoms of increased intracranial pressure and meningeal irritation in the course of a PNEUMONIA points strongly to a pneumococcus meningitis. The normal cerebrospinal fluid shows, however, that this is not the case. It also excludes a complicating tubercular meningitis. The bulging fontanelle and the increased pressure under which the cerebrospinal fluid escaped when the lumbar puncture was done show, nevertheless, that there is an accumulation of fluid within the cranium. The absence of an excess of cells and of a fibrin clot in the cerebrospinal fluid proves that this accumulation of fluid is not due to an inflammatory process in the meninges. The most reasonable explanation is that it is due to increased secretion as the result of the irritation caused by the toxic products of the pneumococcus in the blood. The condition is, therefore, the so-called SEROUS MENINGITIS.

Prognosis. The outlook is very dark, because, although the intracranial pressure can be kept down by repeated lumbar punctures, it shows a degree of toxæmia which of itself is almost certain to prove fatal. The point most in his favor is that, this being the seventh day of the pneumonia, the crisis may be expected at any time.

Treatment. Nothing can be done to diminish the secretion of cerebrospinal fluid. It can, however, be removed by lumbar puncture as fast as it is formed. Lumbar puncture should be done, therefore, as soon as there is much bulging of the fontanelle and the fluid drawn off until the fontanelle is depressed, even if the operation has to be repeated every few hours. The further treatment is that of pneumonia in general. (See Cases 113 and 114.)

CASE 170. Robert K., two and three-fourths years old, was the child of healthy parents. One brother was alive and well, another had died at birth. There had been no miscarriages. There was no tuberculosis in the family and there had been no known exposure to tuberculosis. He was born at full term after a normal labor and was normal at birth. He was nursed for eleven months. He had always been well, except for measles a year before and frequent colds with bronchitis.

He fell down stairs, striking his head, early in the morning of August 3. He was apparently not hurt and appeared well all day. He began to vomit during the morning of August 4 and continued to vomit, at intervals of about an hour, until 3 A.M., August 5. He did not vomit again. There had been no known indiscretion in diet and the bowels were open. He was delirious in the early morning. He was admitted to the Children's Hospital at 2 P.M., August 5.

Physical Examination. He was well developed and nourished and of good color. He was restless and irrational but, when roused, noticed a little. There was no rigidity of the neck and no neck sign. The pupils were equal and reacted to light. The tongue was fairly clean. The throat, heart, lungs and abdomen were normal. The liver and spleen were not palpable. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no ankle clonus. The rectal temperature was 99.8° F., the pulse 120, the respiration 36.

The urine was light yellow in color, clear, acid in reaction and contained no albumin, sugar or acetone. The sediment contained a few epithelial cells and crystals of uric acid.

The fluid obtained by lumbar puncture was under considerable pressure. It ran clear at first, but the last of it was somewhat bloodstained. No fibrin clot formed in twenty-four hours. It contained 360 cells to the cubic millimeter, a part of which were undoubtedly due to the admixture of blood. The differential count of these cells, which showed 90% of mononuclear to 10% of polynuclear, shows that only a few of them came from the blood, because, if many of them had come from the blood, the number of polynuclear

cells would have at least equaled that of the mononuclear. No tubercle bacilli or other organisms were seen on a routine examination, and cultures were sterile.

He passed a very restless night and at times was quite noisy, requiring morphia to keep him quiet. He was quiet

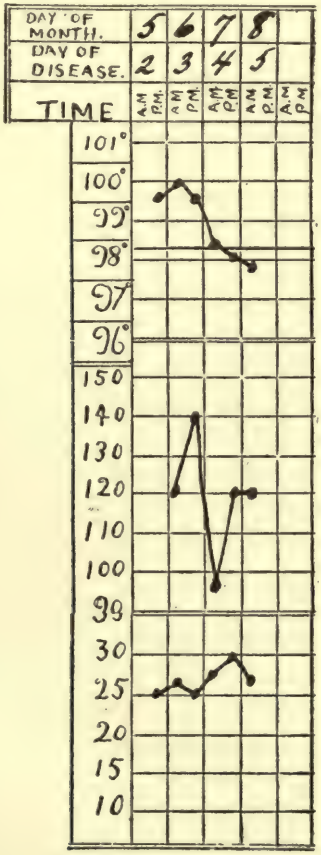


CHART OF ROBERT K. CASE 170.

and drowsy the morning of August 6. There was no rigidity of the neck or neck sign. The pupils were equal and reacted to light. The knee-jerks were equal and lively, the abdominal and cremasteric reflexes normal. There was no Kernig's sign and no ankle clonus.

He was quiet August 7. There was slight rigidity of the neck. The pupils were equal and reacted to light. The

knee-jerks were present and equal, but sluggish. There was a suggestion of Kernig's sign on the left but none on the right. Babinski's phenomenon was absent.

He recognized and spoke to his parents and remembered the names of friends and relatives August 8. He noticed more and was afraid of the light used to test the reaction of the pupils. They were equal and reacted to light. There was no rigidity of the neck, and no neck sign. There was no spasm or paralysis. The knee-jerks were equal and normal. The abdominal and cremasteric reflexes were not obtained. Kernig's and Babinski's signs were absent. Sensation to touch and pain was normal.

The white blood count was 10,100.

Another lumbar puncture was done. The fluid was clear and contained 480 cells to the cubic millimeter, 97% of which were small mononuclear. Many of the cells were degenerated. No organisms were seen in a routine examination, and cultures were sterile.

He was seen at 10 A.M., August 8.

Diagnosis. The positive findings in the cerebrospinal fluid show that the trouble is located in the central nervous system (see Case 38 for description of the normal cerebrospinal fluid and of the fluid in meningitis). They exclude all forms of meningitis except the tubercular, but are also consistent with acute poliomyelo-encephalitis, in the acute stage of which the cerebrospinal fluid contains a considerable excess of cells, largely small mononuclear. The diagnosis lies, therefore, between tubercular meningitis and acute poliomyelo-encephalitis. If it is poliomyelo-encephalitis, the stress of the disease has fallen in this instance, of course, on the cerebrum, and it can be spoken of as an encephalitis.

The absence of a family history of, or of exposure to, tuberculosis does not rule out tubercular meningitis; the history of an attack of measles in the past is a small point in its favor. The acuteness of the onset is somewhat in favor of encephalitis, but is not inconsistent with tubercular meningitis. The fall was probably purely a coincidence, but, in any case, is of no assistance in differential diagnosis as it might predispose to the development of either condi-

tion. There is nothing about the symptomatology which is inconsistent with either condition, although the absence of the neck sign and the slightness of the changes in the reflexes and of the rigidity of the neck are somewhat against tubercular meningitis. The improvement in the symptoms and the drop in the temperature, while they suggest the beginning of convalescence from encephalitis, do not by any means exclude tubercular meningitis, because remissions are characteristic of this disease. The absence of leucocytosis is common to both diseases. The absence of a fibrin clot in the cerebrospinal fluid counts against tubercular meningitis; the absence of tubercle bacilli does not, because they are not found in more than ten per cent of the cases, if the examination is merely a routine one. A positive diagnosis is, therefore, impossible. The weight of the evidence, is, however, somewhat in favor of ENCEPHALITIS, sufficiently so to justify it as a provisional diagnosis. Time alone can decide whether or not it is correct.

Prognosis. If the diagnosis of encephalitis is correct, the prognosis is very good. He will almost certainly recover entirely and be left without sequelæ, either mental or physical.

Treatment. The treatment can only be symptomatic. Nothing can be done in any way to modify the course of the encephalitis.

CASE 171. Fred C., seven and one-half years old, had always been well except for measles and whooping-cough some years before. He had been spending the summer in a locality within twenty miles of which there had been several cases of infantile paralysis during the past few weeks.

He complained of headache the afternoon of September 7. He vomited and was somewhat feverish the next morning, but went in bathing that noon as usual. He complained in the evening that his throat felt a little full. He was given a laxative that night and had a good movement the morning of the 9th. He was brought home that day by train, a journey of about one hundred and twenty-five miles. He took a little milk and ate several crackers on the way. He walked out of the station to his automobile without difficulty. He undressed himself and ate a little supper, although he complained that it was hard for him to swallow. He was seen by his physician in the early evening. The physical examination, including the throat, showing nothing abnormal. His mouth temperature was 103° F., his pulse 115, and rather feeble. He collapsed about midnight and was seen again soon after by his physician. He was then slightly cyanotic. His pulse was very feeble and his respiration rapid. He was unable to swallow anything, not even his saliva. He was given an enema of hot milk and brandy and soon rallied. His color continued bad and his respiration rapid, however, and he was unable to swallow. He was seen in consultation at 7.30 A.M., September 10.

Physical Examination. He was well developed and nourished and perfectly clear mentally. His face and extremities were a little dusky. There was no rigidity of the neck. He could move his head, but could not turn himself in bed. The pupils were equal and reacted to light. There was no paralysis of the eye muscles and no facial paralysis. His respiration was rapid but not noisy. He was coughing constantly but feebly, and was all the time trying, but usually unsuccessfully, to spit up bloody, frothy mucus. He could stick out his tongue. There was no paralysis of the soft palate. The throat was normal to inspection and palpation. He could speak a word or two at a time

distinctly. Respiration was entirely diaphragmatic. There was no movement of the chest wall, and the accessory muscles of respiration were not acting. There was no retraction of the suprasternal, supraclavicular or intercostal spaces. The respiratory sound was feeble, alike on both sides and normal in character. No râles were heard in front; the backs were not examined. The cardiac area was normal, the action a little irregular, the rate 124, the first sound of fair strength, and there were no murmurs. The abdomen was normal. The liver and spleen were not palpable. He could move his arms, but the movements were feeble. The abdominal and cremasteric reflexes were present. The legs were not examined.

Diagnosis. The normal condition of the throat, the clear voice, the quiet respiration and the absence of retraction rule out all forms of obstruction of the air passages. There is no disease of the lungs which causes bilateral immobility of the chest. Edema of the lungs from cardiac failure is suggested by the bloody, frothy expectoration, but is excluded by the normal size and fair strength of the heart and the absence of râles. The only possible explanation of the symptoms is paralysis of the muscles of respiration. This explanation is justified by the physical examination. There is also a paresis of the muscles of the arms and trunk. The difficulty in deglutition and the irregularity of the pulse make it probable that the pneumogastric nerve is also involved. The only disease of the nervous system which will explain the sudden appearance of this combination of symptoms is acute poliomyelo-encephalitis, commonly known as INFANTILE PARALYSIS.

Prognosis. The prognosis is absolutely hopeless. He will probably live but a few hours.

Treatment. There is no treatment which can do more than perhaps delay the fatal outcome a few hours. Oxygen must be given freely. Strychnia and caffein-sodium benzoate or salicylate may be given subcutaneously. The administration of morphia subcutaneously is justifiable, if he is very uncomfortable.

CASE 172. John P., three years old, was the child of healthy parents and had always been well and strong. He had had a slight disturbance of the digestion August 20, which had yielded promptly to catharsis and regulation of the diet. He was restless and a little feverish during the evening of August 28, was given a large dose of castor oil by his mother and had several large, well-digested movements from it. It was discovered the next morning that he could not use his legs properly. He could move them in all directions, but the movements were feeble. The rectal temperature that morning was 101° F. There was no increase in the weakness of the legs during the day and he slept all that night. The loss of power was much more marked, however, the morning of the 30th. He complained of pain in his feet for the first time that morning. There was no disturbance of defecation or micturition. He had had no other symptoms. He was seen in consultation August 30 at 10.30 A.M.

Physical Examination. He was well developed and nourished and of good color. He was perfectly clear mentally. There was no paralysis of any of the muscles controlled by the cranial nerves. The tongue was slightly coated; the throat was normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. He used his arms freely. He held up his head well. He could sit alone, but rather feebly, the feebleness being due to the insufficiency of his legs. There was no deformity of the spine, which was normally flexible. The only motion which he could make with his legs was to flex the left toes a little. When the thighs were flexed on the body he could hold the left one there for an instant; the right dropped outward at once. The bones and joints were normal. Passive motions were not limited or painful. The abdominal and cremasteric reflexes were normal. The knee-jerks were absent on both sides. Kernig's and Babinski's signs were absent. Sensation to touch and pain was normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99° F.

Diagnosis. The history and physical examination exclude

at once, of course, injuries and diseases of the bones and joints. Rheumatism is not accompanied by flaccid paralysis. The paralysis must be due, therefore, to some disease of the nervous system. The absence of all symptoms of meningeal irritation, the clear mind, the paraplegic distribution of the paralysis and the absence of the knee-jerks exclude disease of the brain. The sudden onset and the absence of disturbances of sensation rule out disease of the peripheral nerves. The lesion must, therefore, be located in the spinal cord. The combination of loss of power and reflexes without disturbance of sensation occurs only in lesions of the anterior horns. Such lesions develop acutely in childhood only in the disease known as INFANTILE PARALYSIS. This is, therefore, the diagnosis.

Prognosis. The chance of the extension of the process upward and of involvement of the respiratory muscles is so slight that a positively favorable prognosis as to life is allowable. There will, in fact, in all probability be no further extension of the paralysis. The paralysis is certain to improve a great deal. It is impossible to state now how great the improvement will be. He may recover entirely, but will in all probability be left with considerable disability in the right leg and a little in the left. There will be little improvement after the first six months.

Treatment. Nothing whatever can be done to modify the pathological process in the nervous system. There are no drugs which can possibly do any good, since the harm is already done. It is unreasonable to expect external applications to have any effect on the spinal cord, which is located inside the vertebral column and has an entirely different blood supply from the superficial tissues. The only thing that they can do is to disturb the patient. While nothing can be done to shorten the course of the disease or to limit its progress, there is no doubt that the use or the attempted use of the extremities involved tends, during the acute stage, to delay the process of repair in the nervous system and possibly, very early, to favor the extension of the process. He should, therefore, be kept as quiet as possible for six weeks, when the acute stage is presumably over. If he has much pain, he

should be kept quiet for three weeks after the cessation of the pain. Massage and electricity have the same action as the use of the extremities and should not, therefore, be begun for six weeks. It is very important during this period, however, to prevent the development of contractures, which make the subsequent treatment much more difficult. The weight of the bedclothes must be kept off of his legs by a cradle. A light wire splint will prevent extension of the feet and flexion of the knees. Strychnia is a stimulant to the motor nerves and is, therefore, contra-indicated during the acute stage. Hexamethylenamine cannot be expected to do any good now, since the harm is already done. It is possible, however, that it may destroy or inhibit the growth of the micro-organisms which cause the disease and prevent them from escaping from the body and causing the disease in others. It will be well, therefore, to give him three grains of hexamethylenamine three times daily. It goes without saying, of course, that he must have good food and plenty of it, a liberal amount of fresh air and sunlight and good care in general.

After the expiration of the acute stage he can begin to try to use his legs, must have vigorous and active treatment by electricity and massage and will be helped by strychnia. Treatment is most effectual during the first six months. Little improvement can be expected after this time, except from muscle training. It is extremely important, therefore, to give him every attention during this time and not to put off treatment until some future period.

CASE 173. Nathaniel F., nine years old, had not been away from home for some months and had seen no children except a few with whom he went to a private school near by. There had been but four cases of infantile paralysis in the whole state during the year and the last one of these was several months before. He had always been well, except for whooping-cough at four and measles at six years, although he had not been very vigorous until the past year. He was vaccinated November 27. A number of other children who were vaccinated at the same time, by the same physician, with the same virus, were well. He did not seem quite like himself December 3 and 4, and lay around the house instead of going to school. His symptoms were attributed to the vaccination, although the wound was perfectly healthy and there was no undue inflammation about it. He seemed all right December 5 and 6, and the morning of December 7. He complained of headache on his return from school that noon, vomited and went to bed. He had a restless night and at times complained of severe headache. He was given calomel by his mother and his bowels moved freely in the morning. His legs seemed a little weak when he went to the bathroom the next morning. He was first seen by his physician at 10.30 A.M., December 8. His mouth temperature was then 104.2° F., he was a little tremulous and at times irrational. The physical examination was negative. He grew rapidly worse during the day and became more and more irrational. When seen by his physician at 8.30 P.M. he complained of pain when his neck was moved, but took but little notice of anything else. The pupils were equal and reacted to light. The knee-jerks were equal, but diminished. The cremasteric and plantar reflexes were normal, but the abdominal were absent. He moved his arms well, but was able to move the legs only a little. The axillary temperature was 103.5° F.; the pulse, 138; the respiration, 50. He continued to grow worse during the night and was seen again by his physician and a consultant at 2 A.M., December 9. He was then unconscious. The pupils were equal and reacted to light. He swallowed rather poorly. He was able to move his arms a little, but had no control over his legs, which were

flaccid. The abdominal and cremasteric reflexes were absent, as were the knee-jerks. The left plantar reflex was normal, the right was much diminished. The bowels had moved involuntarily during the night and retention of the urine had developed. The urine was drawn by a catheter and found normal. Lumbar puncture showed no increase in the cerebrospinal pressure. The fluid was clear and no fibrin clot formed. No microscopic examination was made. The leucocyte count was 12,000. His temperature was kept down during the day by sponging. The pulse was regular and averaged about 130. The respiration continued rapid and became more and more diaphragmatic in type. He was unable to take nourishment and did not retain enemata of physiological salt solution. He was seen in consultation at midnight, December 9.

Physical Examination. He was an exceptionally well developed and nourished boy. The cheeks were flushed. He was absolutely unconscious, except that when the eyelids were raised he looked around a very little as if he had a certain realization of what was going on about him. The pupils were equal and reacted to light. There was no strabismus. There was no rigidity of the neck or neck sign, and no spasm or paralysis of the facial muscles. The mouth and throat were evidently full of mucus, although they were not examined. There was some drooling, but not as much as there would have been if he had not been able to swallow the greater part of his saliva. There was almost no motion of the right side of the chest and very little of the left, the breathing being mostly diaphragmatic. The heart and lungs were normal. The abdomen was level and negative. The liver and spleen were not palpable. There was complete flaccid paralysis of both the arms and legs. The abdominal and cremasteric reflexes were absent, as were the knee-jerks and the plantar reflexes. Kernig's sign was absent. It was impossible to determine whether or not he felt pain. The rectal temperature was 102.4° F.; the pulse, 128; the respiration, 40.

Diagnosis. The flaccidity of the paralysis and the absence of the superficial and deep reflexes show that the lesion is not

located in the brain. The sudden onset, the high temperature and the absence of pain and disturbances of sensation in the beginning are inconsistent with a peripheral paralysis. The lesion must, therefore, be located in the spinal cord. The combination of flaccidity and absent reflexes occurs only when the anterior horns are involved. The progressive character of the paralysis shows that the lesion is an ascending one. The only disease in which this combination of symptoms occurs is the ASCENDING TYPE OF INFANTILE PARALYSIS (Poliomyelo-encephalitis). The fact that it is December is not sufficient to exclude it, although infantile paralysis is rare in the cold months. It is noteworthy, however, that the weather had been unusually warm for the time of year for nearly two weeks. This suggests the possibility that some insect, usually destroyed by the cold, has acted as an intermediate host.

Prognosis. The prognosis is practically hopeless. If the process stops where it is he will survive, but will be left more or less paralyzed. If it extends, as it almost certainly will, he will die of respiratory paralysis in the course of the next forty-eight hours.

Treatment. There is no specific treatment for this disease. It is probably too late for hexamethylenamin to do any good, as the harm has already been done. It will be well, however, to give it to him in doses of 15 grains, every four hours. It will, of course, have to be given by enema or through a tube, as he is unable to swallow. He should be given oxygen, if the difficulty with the respiration increases, and cardiac stimulants when they are needed. It will also be well to give him salt solution by rectum. It is hardly worth while to attempt to give him nourishment, however, until it becomes evident whether he is to survive or not, because he will not suffer from the lack of food during the next forty-eight hours.

CASE 174. Ambrose M., nine years old, had a sore throat the last week in March. He was not sick enough to be in bed and no physician was called. He returned to school after a week. His voice became somewhat unnatural about April 25, and several days later liquids began to come through his nose when he drank. He found, May 1, that he could not see the blackboard very well, and a few days later began to have some difficulty in walking steadily. These symptoms were all present when he was seen, May 6.

Physical Examination. He was well developed and nourished, but rather pale. His tongue was clean and was protruded in the median line. The gums were healthy. His throat was normal, except that the soft palate moved but little when he spoke. His voice was somewhat hoarse. There was moderate internal strabismus on the right. The pupils were equal and reacted to both light and accommodation. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. He moved his arms freely and his grip was strong. He moved his legs freely but with little muscular power. He walked a little unsteadily. His legs felt flabby and were rather cool. The knee-jerks were absent on both sides. The abdominal and cremasteric reflexes were somewhat diminished. Kernig's and Babinski's signs were absent. Sensation to touch was somewhat blunted, but that to pain and temperature was normal. There was no tenderness anywhere. There was no enlargement of the peripheral lymph nodes.

The urine was normal in color, acid in reaction and of a specific gravity of 1,018. It contained neither albumin nor sugar.

Diagnosis. The paresis of the legs in combination with the loss of the knee-jerks suggests to a certain extent infantile paralysis. A slow onset and a paraplegic distribution of the paralysis are, however, uncommon in infantile paralysis. The disturbance of sensation shows that the lesion is in the peripheral nerves, not in the anterior horns. The paresis of the soft palate and of the right external rectus is, moreover, not consistent with infantile paralysis, because, even with our present conception of the pathology of this disease, it would

be hard to conceive of a poliomyelo-encephalitis resulting in paresis of the legs, one muscle of one eye and the soft palate and nothing else. The only possible explanation of this combination in a child of nine is a peripheral paralysis.

This combination is almost pathognomonic of diphtheritic paralysis. The absence of pain and tenderness is also very characteristic. The history of a sore throat a few weeks before the onset of the paralysis makes the diagnosis of DIPHTHERITIC PARALYSIS positive. The only other form of peripheral paralysis at all likely to occur in childhood, that due to lead poisoning, can be excluded, not only because of the typical picture of diphtheritic paralysis which this boy presents, but also on the distribution of the paralysis and the absence of pain and tenderness and of a lead line on the gums.

Prognosis. The prognosis is good. He will probably recover from the paresis of the eye and throat in six or eight weeks. The legs will probably not be well for from four to six months. The reflexes will not return until some time later.

Treatment. He must not use his eyes for near work. It will be easier for him to take solid or semi-solid than liquid food. He must be kept reasonably quiet. Exercise, except in moderation, retards rather than hastens recovery. Care must be taken to prevent, by the use of passive motions or apparatus, the development of contractures. Massage and electricity must be begun at once. Faradism is preferable, if the muscles react to it; if they do not, galvanism must be used. It must be remembered in this connection that the object of both massage and electricity is merely to keep the muscles in good condition until the nerves resume their function, and that they have no direct curative action on the nerves. He should be given strychnia in doses of from one-sixtieth to one-thirtieth of a grain, three times daily, after eating.

CASE 175. Alfred B., two years old, was the fourth child of healthy parents. There had been no deaths or miscarriages. There was no tuberculosis in either family and there had been no known exposure to it. He was born at full term, after a normal labor, and was normal at birth. He was nursed during the first year; since then he had been on a general diet. He had never been sick.

He was drowsy and somewhat feverish October 2, but had no other symptoms whatever, no headache, coryza, cough, vomiting or disturbance of the bowels. He seemed perfectly well the next day. His parents were sure that there was nothing the matter with him the morning of October 4. That afternoon, while running after his father in the yard, he tripped and fell down. When he got up it was noticed at once that his right arm was paralyzed. He did not cry at the time and did not seem hurt in any other way. He had been perfectly well since this time and had partially regained the use of his arm. He was seen October 23.

Physical Examination. He was well developed and nourished and of good color. He was normal mentally. There was no rigidity of the neck or neck sign. The mouth and throat were normal. He had twelve teeth. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. There was no rosary. The heart and lungs were normal. The abdomen showed nothing abnormal. The lower border of the liver was just palpable in the nipple line. The spleen was not palpable. There was no spasm or paralysis of the left arm or legs. The knee-jerks were equal and normal. Kernig's sign was absent. The cremasteric reflexes were lively. The abdominal reflexes were not obtained. The right arm hung limp by the side. He was unable to raise it at the shoulder or to flex it at the elbow. Inward rotation of the humerus was normal, but he was unable to rotate it backward. Extension of the forearm on the arm was normal. He pronated the forearm normally, but could not supinate it as well as on the other side. All movements of the wrist and fingers were normal. There was visible wasting of both the supra- and infra-spinatæ and a little of the upper arm. The scapular muscles felt flabby, as did the deltoid and biceps. The sensation to touch was a little

blunted over the area supplied by the right circumflex nerve. There was very little reaction to pain and no tenderness anywhere. The deep reflexes could not be obtained in either upper extremity. A Roentgenograph showed no evidence of injury about the right shoulder joint or of disease of the bones. There was no enlargement of the peripheral lymph nodes. The rectal temperature was normal.

The urine was normal in color, clear, acid in reaction, and contained no albumin or sugar.

Diagnosis. The persistence of the symptoms, the absence of pain and tenderness and the normal condition of the shoulder-joint and bones, as shown by the Roentgenograph, exclude injury to the shoulder-joint or disease of the bones as causes of the loss of power. The flaccidity of the paralysis rules out any cerebral lesion. The lesion must be located, therefore, in the lower motor neuron. The limitation of the paralysis to a portion of the muscles of one extremity excludes multiple neuritis. The sudden onset is inconsistent with a localized peripheral neuritis. The distribution is not like that of any of the usual types of this condition, and localized peripheral neuritis is extremely unusual at this age. The lesion must be situated, then, in the anterior horn of the spinal cord or in the nerve trunks. If it is situated in the anterior horn, the probable cause is acute poliomyelo-encephalitis (infantile paralysis). The history of malaise and fever two days before the onset of the paralysis strongly suggests this etiology. The sudden onset of the paralysis immediately after a fall is inconsistent with it. Is this story of the sudden onset of the paralysis true, or was the paralysis present before and not noticed until after the fall? If it was present before the fall the history is most characteristic of infantile paralysis; if it was not, the history is strongly against infantile paralysis and in favor of some injury to the nerve trunks. If this is the case, the malaise and fever two days before must have been due to some other cause and were purely a coincidence. It is impossible to know which is the truth. The father, who is a reasonably intelligent man, is positive, however, that the paralysis was not present until after the fall. Is there anything about the distribution of the paralysis which will aid in locating the lesion? The

muscles involved are the supraspinatus and the infraspinatus, the deltoid, the flexors of the forearm, that is, the biceps and brachialis anticus, and, to a certain extent, the supinator longus. This distribution of the paralysis is exactly that which occurs in Erb's paralysis and obstetric paralysis, both of which are due to an injury to the brachial plexus. The ganglion cells of the nerves which supply these muscles are all located in the fourth, fifth and sixth cervical segments. The limitation of the lesion to these three segments is not inconsistent with infantile paralysis. It would be most unusual, however, to have the lesion limited to the ganglion cells controlling just the muscles affected when the lesion is located in the brachial plexus, while the ganglion cells controlling other muscles are entirely unaffected. It seems much more reasonable that the lesion is located in the brachial plexus. Another point in favor of this location is the blunting of the sensation in the area supplied by the circumflex nerve (the motor nerve of the deltoid), which shows that the sensory as well as the motor fibres of this nerve are involved. This is more consistent with a lesion outside than within the spinal cord. The diagnosis of ERB'S PARALYSIS, as the result of an injury to the brachial plexus at the time of the fall, seems, therefore, the most reasonable one.

Prognosis. The prognosis must at present be somewhat indefinite. There will undoubtedly be a great deal of improvement in the paralysis. It is possible that there will be complete recovery, but, in all probability, some permanent disability will be left. How great this disability will be cannot be told for a year or two, after which time little improvement can be expected.

Treatment. The arm must be placed in a sling to take the weight of the arm off of the shoulder muscles. He should be encouraged to use it, and passive motions should be made to prevent the development of contractures. Massage and electricity should be begun at once, the object of them both being to keep up the tone of the muscles until the nerves regain their power. Faradism should be used if the muscles react; if they do not, galvanism. There will be but little advantage in keeping up treatment after a year.

CASE 176. Joseph R., four years old, was the child of healthy parents. Five other children were well and there had been no deaths or miscarriages. There had been no known exposure to tuberculosis.

He was born at full term after a normal labor, was normal at birth and weighed ten pounds. He was nursed for ten months and did very well. He had otitis media, followed by mastoid inflammation and operation, when he was one and one-half years old, but made a perfect recovery. He had measles when three and one-half years old and mumps a few months later, but had otherwise been well and strong. He was said to have had pneumonia, lasting eight or nine days, in the early part of December, but was not very sick, and had no marked cerebral symptoms. Soon after getting up from the " pneumonia " he began to stagger a little, " as if drunk." The staggering increased rather rapidly in severity for a time and then remained unchanged. He also began to complain of occipital headache at about the same time. The headache was, however, never very severe, was not continuous and did not prevent him from sleeping. He began to vomit about Christmas and had continued to do so. The vomiting had no apparent relation to food. There were no other signs of indigestion, his appetite was good and his bowels moved regularly. He sometimes vomited with great force. He was bright and happy when his head did not ache, and played as much as his unsteady gait would permit. He had no trouble with sight or hearing and his memory was good. He was seen January 28.

Physical Examination. He was fairly developed and nourished and of good color. His skin was rather dry. He was perfectly clear mentally. There was no tenderness on percussion of the skull. Macewen's sign was absent. There was no rigidity of the neck. He both saw and heard. The eardrums were normal. The pupils were equal and reacted to light. The right eye showed an optic neuritis of the choked-disk type with a fair amount of swelling; the left eye showed similar but less marked changes. There was no spasm or paralysis of any of the muscles controlled by the cranial nerves. He held his head up straight and sat up straight.

His tongue was clean and the mouth and throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. He used his hands normally. He walked a little unsteadily and, on turning, staggered and almost fell. There was no tendency to fall to one side more than to the other. There was no spasm of the legs, and when lying down he could make all motions without difficulty. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. The cremasteric and abdominal reflexes were normal. Sensation to touch and pain was normal by rough tests. The genitals were normal. There was no eruption and there were no scars of old eruptions. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 98.6° F., the pulse 96, the respiration 24.

The urine showed nothing abnormal.

The white corpuscles numbered 8,000.

A tuberculin skin test was negative.

Diagnosis. The persistent vomiting without other symptoms of indigestion, the projectile character of the vomiting, the occipital headache without disturbance of digestion, disease of the kidney or eyestrain, and the staggering gait without disease of the ears form a combination of symptoms that can be explained only by some trouble in the brain. The optic neuritis proves that there is a cerebral lesion. The condition is, of course, a chronic one. The first possibility which suggests itself is an abscess of the brain resulting from the otitis media two and one-half years before. Cerebral abscess is very rare at this age and a latent period of two and one-half years without any symptoms is most unusual. These facts, together with the normal condition of the ears and the absence of fever and leucocytosis, make an abscess extremely improbable. Another possibility is that the illness which was called pneumonia was, in spite of the lack of nervous symptoms, an encephalitis and that the present symptoms are the result of it. It would be hardly possible, however, for an encephalitis to be mistaken for a pneumonia, although a pneumonia might easily be mistaken for an encephalitis. The lesions caused by an encephalitis would not be likely to cause an optic neuritis and would almost certainly produce

some spasm, paralysis, change in the reflexes or mental disturbance. The most reasonable explanation for his symptoms is a rather rapidly growing cerebral tumor. The optic neuritis, projectile vomiting and staggering all point to it. The absence of Macewen's sign does not count much against the presence of a tumor, because it is often hard to elicit and is often absent when the tumor is deep seated. The location of the pain in the occiput and the reeling gait make it probable that the TUMOR is in the CEREBELLUM. The absence of spasm, paralysis and changes in the reflexes is negative evidence in favor of this location. Nearly forty per cent of cerebral tumors in childhood are, moreover, in the cerebellum.

It is impossible to more than guess at the nature of the tumor. The negative tuberculin test practically rules out a solitary tubercle, although about fifty per cent of the cerebral tumors in childhood are tubercular. Gumma is extremely rare at this age, the family history is good, there is nothing in his past history to suggest syphilis, and the physical examination shows no sign of syphilis in the past or at present. A gumma can, therefore, be excluded. The chances lie between a glioma and a sarcoma, the former being somewhat the more probable as gliomata are more common than sarcomata at this age.

Prognosis. The prognosis is hopeless. He will probably not live more than three or four months, perhaps not as long.

Treatment. The treatment can be only symptomatic and for comfort. He must not be allowed to suffer pain when morphia will relieve him. It will be well, perhaps, to give him iodide of potash up to the physiological limit on the possibility that the tumor may be a gumma. It will probably do no good, but can do no harm. The chances of the successful removal of the tumor by an operation are practically nil. It will be only fair, however, to state the facts to the parents and allow them to decide as to whether or not they wish an operation. A lumbar puncture should not be done because it is very likely to cause sudden death when there is a cerebral tumor, especially if it is located in the cerebellum.

CASE 177. Elizabeth C., three years old, was the only child of extremely neurotic but healthy parents. There had been no miscarriages. She had always been well.

Her mother left her with an attendant one afternoon. She was pulled up from the floor by the arms a number of times and had also swung on a gate with her arms extended. She had had no fall. She complained a little of pain in her left arm before she went to bed, but nothing was thought of it. No one could tell whether she used her arm or not during the late afternoon before she went to bed. She slept well all night, seemed perfectly well in the morning and ate a good breakfast, but did not use her left arm at all. She apparently had no pain in it. She was seen at 2 P.M.

Physical Examination. She was well developed and nourished and of good color. She was very bright and much interested in her surroundings. There was no rigidity of the neck and no paralysis of any of the muscles controlled by the cranial nerves. She had twenty teeth. Her tongue was clean; her gums, mouth and throat were normal. There was a slight rosary. The heart and lungs were normal. The abdomen was rather large and lax, but otherwise normal. The liver and spleen were not palpable. Her left arm hung limply by her side with the palm turned backward and the fingers partially flexed. She would not reach out for or take hold of anything. There was no tenderness about the joints or bones or along the nerve trunks. There were no evidences of fracture or dislocation. There was no swelling or redness. Passive motions were not limited or painful. There was apparently no disturbance of the sensations to touch or pain. The reflexes of the arms were normal. She used her right arm and legs freely. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. She was slightly knock-kneed, but there was no enlargement of the epiphyses at the wrists and ankles. There was no enlargement of the peripheral lymph nodes. There were no mucous patches and no eruption or signs of old eruptions. The rectal temperature was 98.6° F.

Diagnosis. Scurvy, while a possibility, is very improbable in a child of three on a general diet. It can be excluded on

the localization of the symptoms in one extremity, the absence of pain on passive motion and the absence of swelling and tenderness. Syphilitic periosteitis can be ruled out on the good family and past history, the absence of signs of syphilis in the past or present, the absence of local tenderness and swelling, and the localization in one extremity. Acute periosteitis or osteomyelitis can be excluded on the good general condition and the absence of fever, pain and tenderness. The history of fleeting pain is like that of rheumatism at this age. Children do not stop using their extremities when they have rheumatism, however, and the pain is usually more general. The onset and development of the paralysis, although unusual, are not inconsistent with infantile paralysis, but the absence of fever and the retention of the reflexes practically exclude it. The position of the arm suggests that there may have been some pressure on the brachial plexus. It is hard to see how this could have happened in her case, and the absence of disturbances of sensation makes it very improbable. There is no dislocation or evidence of injury to the arm at present. It is very possible, however, that there may have been a partial dislocation of the shoulder as the result of the pulling up by the arms or of the swinging, with immediate spontaneous reduction. The subconscious memory of the pain caused by motion of the arm at that time may account for the failure to use it now. This seems, at any rate, the most plausible explanation. In an older child or adult it would be called an HYSTERICAL PARALYSIS.

Prognosis. The prognosis is perfectly good. If she can be sufficiently interested in some game or toy to forget herself entirely, she will use the arm at once.

Treatment. The treatment consists in getting her mind entirely off of herself so that she will unconsciously use the arm again.

CASE 178. Susan T., two and one-half years old, was brought to the Infants' Hospital from the Children's Aid Society, which had had her two weeks. Her forehead was large when she came to them and had not increased in size. Her mother had not noticed the enlargement but, when it was called to her attention, remembered that she had fallen out of bed some weeks before. She had had cerebrospinal meningitis six months previously, but had been well since then. While with the Children's Aid Society she had seemed perfectly well, except that at times she acted as if her head was painful.

Physical Examination. She was well developed and nourished and of fair color. She seemed normal mentally. The forehead projected forward, as is shown in the accompanying photograph. The swelling was symmetrical and hard, but not red or tender. The veins on its surface were enlarged. Pressure on it caused no discomfort, spasm of extremities or change in the pulse or respiration. There was no fluctuation. The fontanelles and sutures were closed. Percussion of the skull showed slight dullness in the left frontal region. The conjunctivæ were not visible above the irides. There was no disturbance of vision and no spasm or paralysis of any of the muscles supplied by the cranial nerves. She moved her head freely, but rather guardedly. The heart, lungs and abdomen were normal. There was no rosary. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen and kidneys were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent, as was the neck sign. She ran about and played without difficulty. The rectal temperature was 98.6° F.; the pulse, 100; the respiration, 20.

The leucocytes numbered 8,400.

Diagnosis. The bulging of the forehead cannot be due to rickets, the enlargement in this disease being asymmetrical. There are, moreover, no other signs of rickets. The history of an attack of cerebrospinal meningitis some months before suggests hydrocephalus as the cause of the swelling. It would hardly be possible, however, for hydrocephalus to

Susan T. Case 178.

bulge out the forehead without causing separation of the sutures and general enlargement of the head. The fact that the conjunctivæ are not visible above the irides shows, moreover, that there is no pressure downward on the orbital plates. There are no other signs of increased cerebral pressure, there being no spasm, paralysis or exaggeration of the deep reflexes. Pressure on the tumor causes no symptoms of cerebral irritation. Hydrocephalus can, therefore, be excluded. The history of a fall suggests some injury to the bones, with the formation of an abscess. The absence of redness, tenderness and fluctuation, the low white count and the normal temperature prove that this is not the case. The only other possibility is a new growth involving the frontal bones. The characteristics of the tumor are consistent with this diagnosis, as is the absence of all signs of increased cerebral pressure or irritation. New growths at this age are almost invariably sarcomatous. The diagnosis of SARCOMA OF THE SKULL is, therefore, undoubtedly correct. Sarcomata of the skull at this age are almost never primary but secondary to sarcoma elsewhere, most often of the suprarenal capsule, but sometimes of the brain. There is no tumor in the kidney region in this instance, however, and there are no symptoms of increased cerebral pressure or of focal irritation, as would be expected if there were a tumor of the brain. These might be absent, nevertheless, if the tumor was small and situated in the frontal lobe. The dullness on percussion over the left frontal region is suggestive of the presence of such a tumor. It is, however, impossible to determine whether the tumor of the skull is primary or secondary to some focus elsewhere.

Prognosis. The prognosis is practically hopeless. If the tumor of the skull is primary and can be removed, it is almost certain to recur, while if it is secondary, the original focus remains.

Treatment. The only treatment which offers the least hope is the immediate removal of the tumor.

CASE 179. James S. was the first child of healthy parents. There was no history of mental defect, insanity, paralysis or muscular dystrophy in either family. He was born at full term, after an easy labor, appeared normal at birth and weighed nine and three-quarters pounds. He was nursed entirely for five months, given milk and barley water in addition for five months and a rational diet during the last five months. He had never had any symptoms of indigestion and had had no illnesses, except a slight attack of bronchitis when a year old. He had always weighed more than the average baby of his age and had cut his teeth early, the first two having erupted when he was only five months old. He had developed normally mentally, but had always been backward about doing things. He did not hold up his head well until he was eight months old and then held it up very feebly. He still had some difficulty in controlling it long at a time. He could not sit up alone any length of time, but quickly fell over. His arms were weak at first, but he had used them well for a long time. He almost never attempted to use his legs and was unable to roll over. He was brought on account of his backwardness, when fifteen months old.

Physical Examination. He was a good-sized baby and of good color. The head was of good shape and of normal size. The anterior fontanelle was almost closed. He laughed, played and was undoubtedly perfectly normal mentally. He both saw and heard. The pupils were equal and reacted to light. All motions of the face were normal. There were eight teeth. The mouth and throat were normal. There was no disturbance of deglutition and his cry was loud and clear. He was able to hold up his head, but after a short time it fell limply to one side or the other. There was no rosary. The heart and lungs were normal and the respiratory excursion was normal. He was unable to sit alone and when supported his back showed a marked curve of weakness. The spine was normal. The abdomen showed nothing abnormal. The lower border of the liver was just palpable in the nipple line. The spleen was not palpable. There was no enlargement of the epiphyses at the wrists and ankles. He lay with the right thigh rotated outward. When the legs

were straightened there was a moderate amount of knock-knees with separation of the legs. The heads of the femora were in normal position and passive motions at the hips were normal. He used his arms freely and they were reasonably strong, although the muscles felt somewhat flabby. He used his legs but little, but was able to make all motions with them, either wholly or in part, although feebly. The muscles were flabby, especially in the thighs. There was no apparent enlargement of any of the muscles of either the arms or legs. The knee-jerks, cremasteric and abdominal reflexes were absent, as was Kernig's sign. Sensation to touch and pain was normal. No urine could be expressed from the bladder and the anal sphincter was tight. There was no enlargement of the peripheral lymph nodes.

Diagnosis. Weakness from malnutrition can be ruled out by the size of the baby, the good color and the absence of any disturbance of digestion or serious illness in the past. Muscular weakness from rickets can be excluded on the absence of all bony changes of this disease. Idiocy can be eliminated as the cause of the disturbance of motility because of the normal mental development. The absence of any acute illness in the past and the fact that the baby has never been normal rules out poliomyelo-encephalitis as the cause. The paresis resulting from this disease is, moreover, seldom so widespread as in this instance. It is almost never symmetrical and never involves all the muscles of an extremity to the same degree. There is no history of paralysis in either family, the weakness was noticed soon after birth, it involves all the muscles of the extremities to the same extent, there is no hypertrophy of any groups of muscles and the weakness is steadily diminishing. The muscular dystrophies, can, therefore, be excluded. The only disease left to be considered is amyotonia congenita. The history and physical examination of this patient correspond exactly to those of this condition. AMYOTONIA CONGENITA is, therefore, the diagnosis.

Prognosis. This condition has been recognized for so short a time that little is known as to the ultimate prognosis. The fact that but one case has been described in the adult makes it probable, however, that the children either die or recover

completely. There is no involvement of the muscles of organic life in this instance, there has been a progressive improvement in the symptoms and the baby is normal in other respects. The outlook is, therefore, very favorable. He will probably be able to walk by the time he is three years old. It seems reasonable to expect that he will eventually attain full muscular power or that, if he does not, the weakness will not be sufficient to handicap him in any way.

Treatment. There is no drug treatment which is of any use in this condition. He ought not to be forced to attempt to do things which he is unable to do. He should, however, be encouraged to do the things which he is able and given the best opportunity to exercise his muscles. This can be done by letting him play for a time once or twice daily in a warm room with his clothes off. Daily massage and the application of faradic electricity every other day will also aid in developing the muscles.

SECTION XIII.

UNCLASSIFIED DISEASES.

CASE 180.I Sadie H. was the first child of healthy parents. There had been no miscarriages. Her parents were Russians and not related. There was no history of idiocy or nervous diseases in either family.

She was born at full term after a normal labor, and seemed normal at birth. She was nursed for ten months, after which she was given a general diet. Her appetite and digestion had always been good. Constipation began when she was two months old and had persisted. A dry and scaly condition of the face, scalp and extremities developed when she was three months old and had resisted all forms of treatment. She had rather more hair than most children at birth, but this soon dropped out and no more appeared until she was nearly two years old. Her mother noticed when she was six months old that her tongue seemed too large for her mouth and that she drooled more than most babies. When she was eight months old her mother noticed that she was not as bright as other children of her age. Her mental development had, as time went on, dropped progressively farther behind that of other children of her own age. She was seen when three and one-fourth years old, and could then say only a few words. Her parents thought, however, that she understood much of what was said to her. She had not learned to control her sphincters. She cut her first tooth when she was two years old and began to sit up a little when she was two and one-fourth years old. She had not learned to creep or stand. Her large tongue made swallowing difficult and she drooled constantly.

Physical Examination. She took considerable interest in her surroundings, but made no attempt to play with the toys offered to her, although she held them in her hands for a time. She knew her parents and said "Papa" and

"Mamma" and a few other simple words. She was small but fairly nourished. Her skin had a peculiar yellowish pallor. She had considerable rather coarse hair. The face and the top of the head were covered with a dry, scaly eruption. The anterior fontanelle was closed. The head was of good shape, except that it was somewhat flattened on top. The bridge of the nose was flattened and the nostrils wide. The lower lids were rather full. She kept her mouth open and drooled constantly. The thickened and broadened tongue protruded just beyond the lips. She had six incisor teeth which, although only just through the gums, were much blackened. The throat was normal. Her voice was hoarse and deep. The rings of the trachea were distinctly palpable. The neck was not especially short, and there were no supraclavicular pads. She held up her head well but sat up rather feebly, with a marked general kyphosis. This was replaced by a slight lordosis in the lumbar region when she was held upright. There was a moderate rosary and a little flaring of the lower ribs. The heart and lungs were normal. The level of the abdomen was much above that of the thorax, but nothing else abnormal was detected in it. The lower border of the liver was palpable just below the costal border in the nipple line. The spleen was not palpable. The lower legs and feet appeared puffy but did not pit on pressure. The soles of the feet were flat, like those of an infant. The forearms and hands were also puffy, especially in the palms. The hands and feet were cold and the skin of the legs, feet, arms and hands dry, and in places scaly. There was no enlargement of the epiphyses, but the long bones of the extremities seemed larger in circumference than normal. The distance from the anterior superior spine to the sole of the foot was forty-four per cent of the body length, while it should be about fifty per cent. There was no spasm or paralysis. The knee-jerks were equal and diminished. Kernig's sign was absent. The external genitals were normal. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was 98° F. She weighed twenty-two and one-half pounds (average is thirty-four and one-half pounds).

Sporadic Cretinism.

Diagnosis. The history and physical examination of this child are so characteristic of SPORADIC CRETINISM that there is no opportunity for a differential diagnosis. The combination of retarded mental and physical development, yellowish pallor, coarse hair, dry and scaly skin, thickening of the skin of the extremities, broad nose, large tongue, hoarse and deep voice, apparent absence of the thyroid gland, short legs, thickening of the long bones of the extremities and subnormal temperature is pathognomonic of the disease. The flattening of the head, the rosary and the flaring of the lower ribs are undoubtedly signs of a complicating rickets. The delayed dentition, the kyphosis and the enlargement of the abdomen may be due to either, but more probably to the cretinism.

Prognosis. She will undoubtedly improve very materially, both mentally and physically, but too much must not be expected from the thyroid treatment when it is not begun until the patient is over three years old. The physical improvement will probably be much greater and more rapid than the mental. She will almost certainly, however, not attain normal stature, although her proportions will probably be approximately normal and she will be reasonably active. She will probably never develop sufficiently mentally to be a free agent or to support herself, although she will probably be able to do manual labor.

Treatment. The treatment is with some preparation of the thyroid gland. The best preparation is the dessicated extract. The initial dose for this child is one half a grain, three times a day. It must be increased, one quarter of a grain at a time, until toxic symptoms appear. These are nervousness, fever and diarrhea. The dose must then be put back to the largest one which did not cause toxic symptoms and kept there for many months. Later, it may be safe to give smaller doses. It is needless to say that she must continue to take thyroid extract as long as she lives. Her father's financial condition is poor. It will be wise, therefore, to place her in some institution for the care of the feeble-minded.

CASE 181. Rosamond S., the second child of healthy but neurotic parents, was born at full term, after a normal labor, was normal at birth and weighed seven pounds. She was nursed for eight months, after which she was given modified milk. This had been gradually strengthened, so that at the time she was seen she was taking whole milk and oatmeal jelly. She had never had any disturbance of digestion or illnesses of any sort.

When she was six months old her mother noticed that her respiration was unusually rapid and that at times it was a little difficult. She was not sure, however, that these symptoms had not been present previously. Her physician found nothing abnormal on physical examination at this time, but thought that the difficulty with respiration was chiefly expiratory. The symptoms gradually increased in spite of the administration of the syrup of hydriodic acid for two months. The respiration continued rapid and was often a little wheezy, the wheeziness occurring both with inspiration and expiration. She was at times a little blue, but never markedly so. She never appeared uncomfortable, however, and apparently was not inconvenienced in any way. Slight suprasternal retraction had been noticed during the last month and dullness had been found under the manubrium. She was seen in consultation when one year old.

Physical Examination. She was well developed and nourished, and of good color. She was bright and happy and seemed perfectly comfortable. The anterior fontanelle was one and one-half cm. in diameter and level. She had three teeth. She kept her mouth shut and there was no nasal discharge. The throat was normal to inspection and palpation. Her cry and voice were clear. The respiration was rapid but regular. There was slight suprasternal retraction with inspiration. The relation between inspiration and expiration was normal. When she was quiet the respiration was inaudible; when she was active or excited it became a little wheezy. The wheezing was usually more marked in expiration than in inspiration. Extension of the head increased the wheeziness. An indefinite resistance was felt in the suprasternal notch, this resistance being more marked

during expiration than during inspiration. There was moderate dullness under the upper portion of the manubrium, which did not extend down to the cardiac dullness or beyond the edges of the manubrium. The heart and lungs were normal. The intensity of the respiratory sound was the same on both sides. There was no dullness in the interscapular region and the respiratory and voice sounds were normal in character over the upper dorsal spines. There was no rosary. The abdomen showed nothing abnormal. The liver was just palpable in the nipple line. The spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

Diagnosis. The absence of nasal discharge and the closed mouth rule out adenoids and nasopharyngitis as the cause of the difficulty in respiration. The normal condition of the throat, both to inspection and palpation, rules out enlargement of the tonsils and retropharyngeal abscess, while the clear voice and cry exclude disease of the larynx. The normal condition of the lungs rules out trouble below the trachea and primary bronchi. The absence of dullness in the interscapular region, the normal character of the respiratory and voice sounds over the upper dorsal spines, the equal intensity of the respiratory sound on the two sides and the increase in the dyspnea on extension of the head exclude enlargement of the tracheo-bronchial lymph nodes. The resistance in the suprasternal notch is strong evidence in favor of enlargement of the thymus. The increase in this resistance during expiration, in which phase of respiration the thymus is more easily palpable, makes this evidence stronger. The location of the dullness under the upper portion of the manubrium is characteristic of enlargement of the thymus. So also is the increase in the intensity of the symptoms on extension of the head, which narrows the upper opening of the thorax and hence increases the pressure exerted by an enlarged thymus on the neighboring structures. The diagnosis of an ENLARGEMENT OF THE THYMUS is, therefore, justified. A Roentgen ray photograph should be taken, however, to verify

the diagnosis. The normal relation between inspiration and expiration is also of some importance in differentiating obstruction to respiration from enlargement of the thymus from that due to other causes. The greater intensity of the wheezing in expiration than in inspiration is rather unusual, but does not seem sufficient to invalidate the diagnosis.

The enlargement of the thymus is almost certainly the result of simple hypertrophy. The good general condition, the slight amount of the enlargement after six months and the absence of enlargement of the lymph nodes rule out a malignant growth. There are no other signs of syphilis or tuberculosis and the general condition is better than would be expected if the enlargement was tubercular. The good general condition and the absence of fever exclude an abscess. All these affections of the thymus as well as cysts are, moreover, extremely rare, while simple hypertrophy is relatively common.

Prognosis. The facts that the thymus is still comparatively but little enlarged and that the symptoms of compression have increased so little during the six months since their onset make it improbable that it will become large enough to cause any severe symptoms of compression before the normal atrophic changes, which begin at about two years, set in to cause retrogression in size. The slight degree of the enlargement also makes it probable that the gland will diminish rapidly in size under treatment. It is possible, however, that the thymus may suddenly increase in size as the result of acute congestion and cause sudden death from compression. Enlargement of the thymus being in many instances a manifestation of the condition known as "status lymphaticus," it is also possible that she may die suddenly at any time. Both of these possibilities are, however, extremely improbable.

Treatment. There is no drug treatment which will diminish the size of the thymus. The symptoms in this instance are not severe enough at present to warrant thymectomy, which is a dangerous operation and which, if successful, is liable to be followed by interference with the normal development of the nervous and osseous systems. Treatment with the Roentgen ray is, however, safe and will,

in all probability, hasten materially the involution of the enlargement. It should, therefore, be begun at once. As the symptoms are in no way urgent it will be wise, however, not to push the treatment, but to give short exposures at intervals of several days or even weeks.

CASE 182. Sarah A., the second child of healthy parents, was born at full term, January 6, after a normal labor. She was cyanotic at birth and great difficulty was experienced in getting her to breathe. She had never breathed properly, but had not been cyanotic and had been able to nurse without difficulty up to the last ten days. Since then the respiration had been more difficult and she had had repeated attacks, lasting one-half hour or more, in which she breathed with great difficulty and became markedly cyanotic. The respiration was easier, both during and between the attacks, when she was held up than when she was lying down. She had had no other symptoms, had shown no evidences of indigestion and had gained steadily in weight as long as she was able to nurse easily. She was admitted to the Infants' Hospital, March 10, when nine weeks old.

Physical Examination. She was fairly developed and nourished. Her color was good, except for a slight tinge of cyanosis about the mouth. The anterior fontanelle was three cm. in diameter and level. There was no nasal discharge and she kept her mouth shut. The throat showed nothing abnormal on either inspection or palpation. Her cry was clear and fairly loud. There was slight retraction in the suprasternal space and of the epigastrium with inspiration. This was more marked when she was lying down flat than when she was reclining or bolstered up. Expiration was slightly prolonged, but the respiration was quiet. Extension of the head increased the difficulty in respiration. There was slight dullness under the manubrium, which was continuous with the cardiac dullness. Nothing abnormal was detected in the suprasternal space. The heart was normal. The respiratory murmur was somewhat feeble, but alike on both sides. The lungs showed nothing else abnormal. There was no dullness in the interscapular space and the cry was normal in character over the upper dorsal spines. The abdomen showed nothing abnormal. The lower border of the liver was palpable one cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of

the peripheral lymph nodes. The rectal temperature was 99° F.

During the attacks she became markedly cyanotic and breathed with great difficulty, even when sitting up. There was marked retraction of the suprasternal and supraclavicular spaces as well as of the lower chest and epigastrium with inspiration. There was a whistling noise with both inspiration and expiration, more marked with expiration. Expiration was prolonged. The symptoms were much increased by extension of the head.

Diagnosis. The absence of all physical signs of cardiac disease, the development of the attacks of cyanosis without evident cause and the signs of interference with the respiration rule out congenital heart disease as the cause of the symptoms. These must be due to some obstruction to the respiration, either within or without the respiratory tract. The absence of nasal discharge, the closed mouth and the paroxysmal exaggeration of the symptoms rule out adenoids and nasopharyngitis. Enlargement of the tonsils and retropharyngeal abscess are excluded by the physical examination. The clear cry shows that there is no trouble in the larynx. The greater intensity of the whistling noise in expiration, the prolongation of the expiration, the duration of the attacks and the persistence of the symptoms between the attacks rule out laryngismus stridulus. The normal condition of the lungs rules out trouble below the trachea and primary bronchi. The age of the baby, the absence of dullness in the interscapular region, the normal sound of the cry over the upper dorsal spines, the equal intensity of the respiratory sound on the two sides and the increase of symptoms on extension of the head and on lying down exclude enlargement of the tracheo-bronchial lymph nodes. Moreover, the symptoms due to enlargement of these nodes rarely vary so markedly in severity as in this instance. The obstruction to the respiration must, therefore, be located in the trachea. The absence of catarrhal symptoms shows that the obstruction must be due to pressure from the outside. The only organ in this region whose enlargement is likely to cause pressure on the trachea at this age is the thymus. The

dullness under the manubrium is characteristic of enlargement of the thymus. So also is the increase in the intensity of the symptoms on extension of the head and the variation in the severity of the symptoms without evident cause. Prolongation of the expiration and greater difficulty in expiration than in inspiration are somewhat unusual when the obstruction is due to ENLARGEMENT OF THE THYMUS, but are not of sufficient importance to have much weight against the points in favor of this diagnosis. It should be verified, however, by a Roentgen ray photograph. Other causes of enlargement of the thymus at this age are so uncommon that it is safe to conclude that the enlargement in this instance is due to simple hypertrophy. The variations in the severity of the symptoms are in all probability the result of variations in the congestion of the organ.

Prognosis. The outlook in this instance is most unfavorable, because of the early development of the symptoms, the progressive increase in their severity and the occurrence of the suffocative attacks. She is likely to die suddenly in an attack or to gradually fail and die from malnutrition. Her only hope lies in the relief of the pressure by the removal or the reduction of the size of the thymus.

Treatment. There is no drug treatment which will diminish the size of the thymus. Two lines of treatment are possible: operative, to relieve the pressure by the partial or complete extirpation of the gland, or by anchoring it in a new position; exposure to the Roentgen ray, to relieve pressure by causing its involution. The operative treatment is attended by considerable danger, but, if successful, the relief will be immediate. Treatment by the Roentgen ray is safe, but at best several days must elapse before any improvement can be expected and then the relief will be gradual. It is difficult to determine which method to adopt. Either course exposes the baby to grave dangers. It will probably be wiser, however, to try first fairly long daily exposures to the Roentgen ray, and, if improvement does not begin in three or four days, to operate.

CASE 183. Jacob Z. was the sixth child of healthy parents. The other children were well. There had been no miscarriages. He was born at full term, after a normal labor, had been breast-fed and had been well except for occasional slight disturbances of digestion and "colds in the head."

He developed a slight "cold in the head" and croupy cough February 15. A culture taken February 18 showed no Klebs-Lœffler bacilli, and the physical examination at that time showed nothing abnormal except a nasal discharge and moderate reddening of the throat. There was a discharge from the right ear, February 24, and on the twenty-eighth both ears were discharging freely. He had a convulsion on the twenty-eighth and another on the twenty-ninth. He took his food poorly after this, but did not vomit and had normal movements. The rectal temperature during the last week had ranged between 101° F. and 103° F.; his pulse, between 120 and 140; and his respiration, between 40 and 65. He was admitted to the Infants' Hospital, March 1, when ten months old.

Physical Examination. He was large and fat, but moderately pale. The anterior fontanelle was three cm. in diameter and level. There was slight rigidity of the neck, but no neck sign. He noticed, but did not take interest enough to reach out for things. The pupils were equal and reacted to light. There was a profuse purulent discharge from both ears. There was no swelling or tenderness over the mastoids. There was a profuse purulent nasal discharge, but the mouth was kept shut. The throat was generally reddened. The pharynx was slightly edematous on palpation. Digital examination of the larynx showed no swelling. The cry was clear. There was no dullness over the manubrium. The thymus could not be felt in the suprasternal space. There was no rosary. The heart and lungs showed nothing abnormal. The level of the abdomen was that of the thorax. Nothing abnormal was detected in it. The lower border of the liver was palpable four cm. below the costal border in the nipple line. The spleen was palpable three cm. below the costal border. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal

and normal. Kernig's sign was absent. The cremasteric reflexes were feeble, the abdominal were not obtained. There was no enlargement of the peripheral lymph nodes. The respiration was regular, but very peculiar. Inspiration was sighing, while expiration was forcible and often accompanied by blowing out of the lips. There was no retraction anywhere. He was slightly cyanotic unless kept by the open window. The rectal temperature was 103° F.; the pulse, 124; the respiration, 50.

The urine was normal in color, highly acid in reaction and contained a large trace of albumin, but no sugar, acetone or diacetic acid. The sediment showed a considerable number of hyaline and coarse granular casts and casts with cells adherent, but no blood or blood elements. There was, however, no marked diminution in the amount of urine.

The fluid obtained by lumbar puncture was under low pressure and perfectly clear. No fibrin clot was present after twenty-four hours. The fluid contained two cells per cubic millimetre.

Diagnosis. The inflammation of the nasopharynx and middle ears is sufficient to account for the fever. It does not, however, explain the rapidity of the respiration or its peculiar type. If there was obstruction enough to the respiration in the nose and nasopharynx to increase the rate to this extent, the mouth would be kept open, the inspiration would not be sighing and the expiration would not be forcible. The absence of swelling at the entrance of the larynx and the clear cry rule out trouble in the larynx. The character of the respiration and the absence of retraction show, moreover, that the increase in the rate of the respiration cannot be due to obstruction either in the larynx or below it. The normal condition of the lungs rules out disease of these organs as the cause. This must be sought, therefore, outside of the respiratory tract. The absence of all signs of meningeal irritation and the normal cerebrospinal fluid prove that it is not meningitis. It is conceivable that the rapid respiration may be due to reflex irritation from the ears. They are discharging freely, however, and otitis media rarely causes reflex symptoms after the discharge is well established. Reflex irritation would,

moreover, not explain the cyanosis. The normal condition of the heart and the relatively slight increase in the rate of the pulse show that the rapid breathing is not due to cardiac failure. The changes in the urine are characteristic of acute degeneration of the kidneys and are not consistent with any of the conditions which cause uremia. This can, therefore, be excluded as the cause of the rapid respiration, as can also acid intoxication, since there are no acetone bodies in the urine. Sepsis is sometimes a cause of rapid respiration, but only when it is severe. The changes in the urine are undoubtedly due to toxic absorption. The enlargement of the liver and spleen may be interpreted in the same way. The normal condition of the heart, however, makes this interpretation very improbable. There are, moreover, no marked general symptoms of sepsis, as would be expected if sepsis were the cause of the rapid breathing. The only condition which satisfactorily explains the peculiar, rapid respiration is status lymphaticus. Disturbances in respiration associated with cyanosis, not due to obstruction, are characteristic manifestations of this disease. The occurrence of convulsions without definite cause is strong corroborative evidence of this explanation in this instance. The enlargement of the liver and spleen is consistent with this diagnosis. The absence of signs of enlargement of the thymus does not militate against it, because the symptoms in this condition are not due to the presence of an enlarged thymus but to some form of autointoxication. The diagnosis of STATUS LYMPHATICUS as the cause of the rapid and peculiar respiration is. therefore, a reasonable one.

Prognosis. The prognosis is practically hopeless. He will almost certainly die during the next forty-eight hours.

Treatment. There is no specific treatment for the status lymphaticus. He should be placed by an open window. He will probably breathe more easily if bolstered up than when lying down. There is no call for cardiac stimulants at present. They will, moreover, probably prove to be of little value. He should be nursed, if he will take the breast. If he will not, the breast-milk should be taken with a pump and fed to him in a bottle. If sufficient milk cannot be obtained

in this way, he should be given modified milk in addition. A mixture containing 2% of fat, 6% of milk sugar, 1.50% of proteids and 0.75% of starch, without lime water, is a suitable one. He should be offered four ounces, eight times daily, at three hour intervals, but will probably not take it all.

The ears should be syringed with warm water three or four times daily. It will probably be wiser not to disturb him by any active treatment of the nose.

CASE 184. Rosamond M., eight and one-half years old, was the only child of healthy parents. There had been no deaths or miscarriages. She had had no known exposure to tuberculosis. She had always had a feeble digestion and had had to be fed very carefully. She had had chicken-pox and whooping-cough when seven years old and had had her adenoids removed when she was six years old. She had, however, continued to have frequent "colds in her head." Her school and other duties prevented her from getting out of doors more than one, or at most two, hours a day. She had but little fresh air at night.

She had an acute, but not very severe, attack of tonsillitis January 10, which was followed by enlargement of the cervical lymph nodes. They caused her no discomfort. Her appetite had been poor since then, but her digestion was not disturbed. She had no cough and, her mother thought, no fever. She was seen January 30.

Physical Examination. She was fairly developed and nourished and of good color. There was no nasal discharge. She kept her mouth open most of the time, but could breathe freely with it shut. No adenoids were felt with the finger. Her tonsils were not enlarged and appeared healthy. Her throat was, however, very small and her palate highly arched. Her teeth were good and her tongue was clean. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There were numerous discrete, non-tender, freely moveable lymph nodes, varying in size from that of a pea to that of an almond, in both sides of the neck. The inguinal and axillary lymph nodes were not palpable. The bronchial voice was not heard below the seventh cervical spine, the air entered both sides of the chest alike and there were no evidences of increased pressure within the mediastinum. The mouth temperature was 98.4° F.

The leucocytes numbered 8,400.

Diagnosis. She has, of course, CERVICAL ADENITIS. The absence of enlargement of the inguinal and axillary lymph nodes and of all signs of that of the tracheo-bronchial lymph

nodes shows that it is a local process. There seems to be no reason to doubt the mother's statements that the enlargement was not present before the recent attack of tonsillitis and that it developed immediately after it. The process is, therefore, evidently an acute one. The most important point to be decided is whether it is simple or tubercular, leukemia being excluded by the low white count and pseudoleukemia being so improbable on account of its rarity that it need not be considered at this time. There is nothing about the physical examination which is of any aid in the diagnosis. When the cervical lymph nodes enlarge in the course of, or immediately after, some acute inflammatory condition in the nose or throat, they are almost never tubercular. When, on the other hand, they develop slowly, without obvious cause, they almost always are tubercular. The chances are, therefore, that the enlargement in this instance is non-tubercular. The absence of fever is slightly against tuberculosis, that of a leucocytosis in favor of it. Neither point is of much importance, however, as simple adenitis often shows no leucocytosis after the most acute stage has passed and either condition may or may not be accompanied by fever. A single observation of the temperature, moreover, shows but little. The absence of a history of exposure to tuberculosis does not count at all against tuberculosis, because everyone is unknowingly exposed to tuberculosis so frequently. A positive diagnosis on the symptomatology and physical examination is, therefore, impossible. On the doctrine of chances, however, the enlargement is in all probability not tubercular. A skin tuberculin test should be tried. A negative reaction will practically prove that it is not tubercular. A positive reaction will prove nothing as to its character, because the reaction may just as well be due to some tubercular focus elsewhere as to the neck. If the tuberculin test is positive, a certain diagnosis can only be made after prolonged observation or by the examination of an excised node.

The open mouth and the highly arched palate are the results of the adenoids in the past.

Prognosis. If the enlargement is not tubercular, as it almost certainly is not, it will probably entirely or almost

entirely disappear within a few weeks, although a few small nodes may persist. There is almost no chance of suppuration.

Treatment. There are no external applications which will in any way hasten the resolution of these nodes. With the possible exception of iodine, there is no drug which, when given internally, will have any direct action upon them. The treatment consists in so regulating her life as to put her in the best possible general condition. It will be wise to send her to school but one session, so that she can spend more hours out of doors. She must have more air at night. There are no special indications as to her diet, which must be adapted to her rather feeble digestive powers. It will be well to give her eight drops of the tincture of nux vomica, in a tablespoonful of water, three times daily, before meals, to improve her appetite and as a general tonic. It will also be well, on account of the possible action of iodine in hastening resolution, to give her twenty drops of the syrup of the iodide of iron, in water, three times daily, after meals.

If the enlargement of the lymph nodes does not disappear in a few months the tonsils should be enucleated, in order to remove the original and possibly the continued source of infection and to diminish the chances of secondary infection with tuberculosis.

CASE 185. Joseph O'C. was the second child of healthy parents. Two other children were well. There had been no deaths or miscarriages. There was no history of tuberculosis in either family and there had been no known exposure to it. He was born at full term, after a normal labor, and was normal at birth. His mother was unable to nurse him and great trouble was experienced in finding anything to agree with him during his first year. His digestion had been perfect since then. He had an attack of laryngeal diphtheria, requiring intubation, when he was twenty-two months old. This was followed, a month later, by bronchopneumonia, since when he had had repeated "colds" and several attacks of bronchitis. His rectal temperature had never been normal since the bronchopneumonia. It usually ranged between 100° F. and 101° F., but was sometimes higher. He had been kept in bed most of the time during this period, because of the fever, not being up more than an hour a day. He had been out of doors during the summer, but had not been out at all during the winter. He had been carefully fed. His appetite and digestion were good and his bowels moved daily. He did not cough, except when he had a "cold." He had been taking a great variety of drugs. He was seen February 4, when three years old.

Physical Examination. He was well developed and nourished, but a little flabby. His color was good. His tongue was clean and his teeth were in good condition. His throat was normal. No adenoids were felt with the finger. The eardrums were normal. The voice was clear. There was no dullness under the manubrium. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There were a few lymph nodes, about the size of peas, in both sides of the neck, but none were felt in the axillæ or groins. The bronchial voice sound was audible over the upper five dorsal spines. There was no increased dullness or change in the respiration in the interscapular space and the respiratory sounds were of the same intensity on both sides of the chest. The rectal temperature was 100° F.; the pulse, 110; the respiration, 24.

The urine was of normal color, clear, acid in reaction, of a specific gravity of 1015 and contained neither albumin nor sugar.

The leucocytes numbered 8,000.

Diagnosis. The physical examination shows that the continued fever is not due to toxic absorption from the mouth, throat, nose or ears. The clean tongue, the good appetite, the absence of all symptoms of indigestion and the regular movements from the bowels show that it is not due to disturbance in the digestive tract. The normal urine excludes infection of the urinary tract and the absence of a leucocytosis shows that there is no hidden inflammatory process going on. The most probable explanation of the continued fever is, therefore, that there is a tubercular focus somewhere in the body. The fact that the fever followed an attack of bronchopneumonia points strongly to the chest as the seat of this focus. The lungs are normal. The bronchial voice sound over the five upper dorsal spines shows, however, that there is enlargement of the tracheobronchial lymph nodes. It is evident from the absence of dullness and bronchial respiration in the interscapular space and the equal intensity of the respiratory sound on the two sides, together with the absence of dullness under the manubrium and of all symptoms of pressure, that this enlargement is not very marked. It seems fair to conclude, therefore, that, in the absence of all signs of tuberculosis elsewhere, the cause of the fever is a tubercular BRONCHIAL ADENITIS. A Roentgenograph should be taken and a skin tuberculin test tried in order to confirm the diagnosis.

Prognosis. The primary focus of tuberculosis at this age is almost always in the tracheobronchial lymph nodes. The tubercular process may extend from them directly to the lungs or the tubercle bacilli may be carried through the blood or lymph vessels, if they become infected, to any part of the body. In the vast majority of instances, however, the disease remains localized in the lymph nodes and recovery eventually takes place. It is impossible to know what will happen in this instance. He is in good general condition, there are no evidences of tuberculosis elsewhere, the enlargement of the

tracheobronchial lymph nodes is slight and there is but little elevation of the temperature. The process is, therefore, not a very active one. The chances are, therefore, that there will be no extension and that he will eventually recover.

Treatment. He must be kept out of doors as much as possible, preferably both day and night. If this is not feasible, the windows must be kept wide open when he is in the house. Too much attention has been attached to the elevation of temperature, which has been but very little above the normal limit for a three year old child. He should not be kept so closely in bed, but should be allowed to get up gradually and to take more exercise. This will improve his general condition and strengthen his resistance. His digestion being good, there is no reason for limiting his diet. All medicines should be stopped.

CASE 186. George R., two and one-half years old, was the child of healthy parents. There were four other children living and well, none had died and there had been no miscarriages. He had always been nervous but had had no illnesses. He had had nothing to eat the night before the onset of the present illness that had not been eaten by the rest of the family, but had been playing out in the snow that day and had got rather wet.

He had a number of attacks of rather severe abdominal pain, lasting from fifteen minutes to an hour, during the night of January 11. He had no other symptoms and appeared all right the next day. Both ankles became painful and swollen January 13, and purpuric spots appeared on the ankles and lower legs the next day. That day he had a very severe attack of abdominal pain, followed by vomiting and diarrhea which lasted for about twelve hours. Neither the vomitus nor the stools contained blood. He was seen January 15 by his physician, who found nothing abnormal on physical examination, except that both ankles were a little swollen and tender and had purpuric spots about them. The temperature was then 99° F. and the pulse 140. He continued to have attacks of severe abdominal pain, lasting from one hour to two hours, but had no other symptoms of indigestion and the bowels moved normally. Both abdominal and rectal examinations were normal on January 18. The urine showed nothing abnormal. The temperature had varied between normal and 99° F., the pulse between 120 and 150.

He did well from that time to January 24, when his scrotum and penis suddenly became much swollen, the scrotum being nearly three times its usual size and very painful. The swelling was pinkish in color and did not pit on pressure. It lasted but a few hours. Purpuric spots appeared on the buttocks at the same time. A similar swelling, the size of the palm of the hand, appeared over the sacrum the next day and disappeared again in a few hours. More purpuric spots also appeared on the buttocks. The attacks of abdominal pain recurred on the 27th. Between them he apparently felt perfectly well. He had no fever. He had been kept on a light diet from the beginning, but this included eggs and broth. He

was given citrate of potash at first and later three grains of the lactate of calcium daily. His bowels had been kept well open. He was seen in consultation January 28.

Physical Examination. He was well developed and nourished and of good color. His tongue was slightly coated, his teeth in good condition. His gums and throat were normal. His heart and lungs were normal. The abdomen was a little sunken and showed nothing abnormal. There were no masses, no tenderness and no muscular spasm. The liver and spleen were not palpable. The penis and scrotum were normal. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. There were a few fading purpuric spots about the ankles and buttocks. A rectal examination showed nothing abnormal.

The urine was normal in color, clear, acid in reaction and of a specific gravity of 1,016. It contained neither albumin nor sugar. The centrifugalized sediment showed an excess of urates and an occasional small round cell, but no casts.

Diagnosis. The attacks of abdominal pain with the attendant vomiting and diarrhea, the swelling and the purpuric eruption about the ankles, and the swelling and purpuric eruption about the genitals and buttocks are undoubtedly merely different manifestations of some abnormal systemic condition. The swellings which appeared in the genitals and over the sacrum have all the characteristics of angioneurotic edema. The eruption on the buttocks deserves the name of purpura simplex. The swelling and eruption about the ankles is typical of purpura rheumatica. The attacks of abdominal pain would be very hard to explain if they occurred alone, but associated, as they are, with other manifestations of purpura, they are quite characteristic of the condition known as abdominal purpura or Henoch's disease. Giving these various symptoms names does not, however, bring us much nearer the diagnosis of the underlying condition. It does emphasize the fact, however, that it is not justifiable to describe the different forms of PURPURA as if they were different diseases, and shows that they are merely different

manifestations of the same condition. The association of the condition known as angioneurotic edema, which is presumably due to a disturbance of the nervous control of the walls of the blood vessels, with the purpuric condition makes it probable that the purpura is due to some toxic action on the vessel walls rather than to a bacterial infection. This assumption is supported by the absence of fever. The presence of the angioneurotic edema in association with the purpura also makes it probable that the purpuric condition is not due to any disturbance of the coagulability of the blood. There is nothing in the history or physical examination to suggest the origin of the toxic substance. The normal condition of the gums and the good health of the other members of the family rule out lead poisoning. The good health of the rest of the family and the absence of symptoms of indigestion make intestinal toxemia very improbable. The etiology must, therefore, remain unsettled. It is possible that the eggs and broth may have had something to do with the continuance of the condition, as they not infrequently cause angioneurotic edema. The attacks of abdominal pain may be due to an angioneurotic edema of the intestinal wall or to a hemorrhage into the wall. The short duration of the attacks and their frequent repetition, as well as the absence of blood in the stools, makes an edematous condition much more probable than a hemorrhagic.

Prognosis. There is no danger as to life unless, as sometimes happens, the local swelling in the intestinal wall causes an intussusception. The prognosis as to duration is, however, very indefinite as the condition not infrequently persists, with longer or shorter intermissions, for many weeks or even months.

Treatment. The etiology being so obscure, the treatment can only be along general lines. He must be protected from chilling and overexertion. His diet should be limited to milk and starches, as they are less likely to form toxic substances in the intestines than are the fats and proteids. He must be given plenty of water and his bowels kept well open, preferably with salines. Although the calcium salts have no special influence on the coagulability of the blood, they have seemed

clinically to be of some use in the treatment of angioneurotic edema and similar conditions. It will be well, therefore, to continue the lactate of calcium, but in larger doses, giving ten grains daily. Animal sera hardly seem indicated at present in this instance, because, if our reasoning is correct, the difficulty is not impaired coagulability of the blood. If the purpuric eruptions continue to recur, or if there are hemorrhages elsewhere, it will be wise, nevertheless, to give them a trial. (See Case 17.)

Heat externally and paregoric, in doses of fifteen or more drops, may be employed for the attacks of pain.

CASE 187. William M. was the second child of healthy parents. The older child was living and well and there had been no deaths or miscarriages. He was born at full term, after a normal labor, was normal at birth and weighed five and one-half pounds. He was nursed for three months and then given equal parts of cows' milk and water. He did well on this until he was six months old. Since then he had vomited several times daily and had had from six to eight stools daily, some of which were green and some yellow. The stools had contained curds up to the last five weeks, during which he had taken nothing but barley water, prepared with a little salt. He had, nevertheless, gained two pounds during the last two weeks. He was admitted to the Children's Hospital when eight months old.

Physical Examination. He was well developed and nourished. The skin and mucous membranes were of fair color. The anterior fontanelle was two cm. in diameter and level. The mouth and throat were normal. There were no teeth. Both the upper and lower eyelids were somewhat puffy. There was no rosary. The cardiac area and sounds were normal. There were no murmurs and there was no venous hum in the neck. The lungs were normal. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line; the lower border was palpable three cm. below the costal border in the same line. The spleen was not palpable. The abdomen showed nothing abnormal. The feet were considerably and the legs moderately swollen. They were not red, hot or tender, but pitted on pressure. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F. He weighed fourteen and three-quarters pounds.

BLOOD.

Hemoglobin,	55%
Red corpuscles,	4,764,000
White corpuscles,	13,000
Small mononuclears,	39%
Large mononuclears,	6%
Polynuclear neutrophiles,	55%

There was moderate achromia, but no irregularity in the size or shape of the red corpuscles and no polychromatophilia.

The urine was clear, of normal color, acid in reaction, of a specific gravity of 1,012 and contained no albumin or sugar. The sediment, obtained by centrifugalization, contained a few leucocytes and small round cells.

Diagnosis. He undoubtedly has a chronic disturbance of both the gastric and intestinal digestion. The most striking abnormality, however, and the one which requires explanation, is the edema of the face and lower extremities. It is fair to assume, also, that there is an accumulation of fluid in the tissues throughout the body, for it would manifestly be impossible for him to have gained two pounds in two weeks on barley water alone, except in this way. The normal condition of the heart and urine shows that the edema cannot be due to disease of the heart or kidneys. The blood shows a slight anemia, not sufficient, however, to account for the edema. It must be due in some way, therefore, to the digestive disturbance or to the food. It may be that the accumulation of liquid in the tissues is due to an excess of salt, and possibly of starch, in the food, which interferes with the normal processes of osmosis. It is conceivable that the walls of the blood vessels may have been directly injured as the result of the insufficient supply of food and of the absorption of toxic products from the intestines, and that they are consequently unduly permeable. There is no proof, however, that this ever happens. It may be, on the other hand, that the increased permeability of the blood vessels is due to a disturbance of the sympathetic vaso-motor control, either from the disturbance of nutrition or from toxic or chemic irritation of the terminal filaments of the nerves in the intestines or vessels. This possibility is also insusceptible of proof. It is wise, therefore, with our present lack of knowledge, to continue to speak of this condition as IDIOPATHIC or essential EDEMA, appreciating the fact, nevertheless, that it is really always a secondary manifestation of some other condition.

Prognosis. His general condition is reasonably good, his heart and kidneys are normal and there is but little anemia,

in spite of the disturbance of digestion for two months and semi-starvation for five weeks. When these points are taken into consideration, it is evident that the edema, although often of serious import, is in this instance a relatively unimportant symptom and that it does not render the prognosis unfavorable. He will undoubtedly recover promptly when he is given proper food. His weight will diminish rapidly until the excess of liquid in the tissues is eliminated, after which he should begin to gain again.

Treatment. The treatment consists of regulation of the diet. The best food for him is, as in all disturbances of digestion in infancy, human milk. It is, however, not a necessity in this instance. He will undoubtedly recover without it. It will be wise to cut out the starch and salt in order to favor the elimination of the liquid in the tissues. It will also be well to keep the sugar a little low for the same reason. It will be advisable, on general principles, to give him a food relatively low in fat and relatively high in proteid. A whey mixture is contraindicated on account of the salts which it contains. A mixture which will fulfill these indications is one containing 2% of fat, 5% of milk sugar and 2% of proteids, without lime water. Eight feedings of five ounces will be sufficient to cover his caloric needs, if the extra weight due to the edema is subtracted. He should not be given any extra water. There is no indication for medicinal treatment.

CASE 188. Douglas S., nine years old, was the fifth child of healthy parents. The other children were living and well, none had died and there had been no miscarriages. There was no tuberculosis in either family and there had been no known exposure to it. He had always been well, except for measles when he was three years old. He was taken suddenly ill with infectious diarrhea, August 18, and had a very severe attack for his age. Improvement began about the tenth of September and was very rapid, the temperature coming down to normal and the movements to one in twenty-four hours, without mucus or blood. There was a recurrence of the fever and of the blood in the stools for a few days about the first of October. He improved again rapidly, however, and was sitting up in bed October 8 and 9. Since the beginning of his illness the diet had been almost entirely composed of carbohydrates. Two days later a little edema was noticed about the eyes and in the feet. This had increased, so that when he was seen, October 15, there was marked edema of the face and considerable edema of the feet, legs, posterior surface of the thighs and back. The temperature had been between 100° F. and 101.5° F., the pulse between 110 and 120 and the respiration between 25 and 30 since the appearance of the edema. He had taken his food well, but had had two or three loose movements from the bowels daily, which did not contain either mucus or blood.

Physical Examination. He felt perfectly comfortable and his color was fair. The tongue was clean. There was no venous hum in the neck. The cardiac area was normal, the sounds were clear and strong, the action regular and there were no murmurs. There was moderate dullness, with slightly diminished respiration and voice sounds, in both backs below the angles of the scapulæ. The lungs were otherwise normal. The liver and spleen were not palpable. The level of the abdomen was that of the thorax. There was shifting dullness in the flanks and a slight fluid wave. The extremities were normal except for the edema. There was no spasm, paralysis or disturbance of the reflexes. There was no enlargement of the peripheral lymph nodes.

The urine was passed in sufficient amounts. It was pale,

acid in reaction and of a specific gravity of 1,015. There was the slightest possible trace of albumin by the heat test, but none with nitric acid. It contained no sugar, acetone or diacetic acid. There was no sediment, even on centrifugalization.

The blood contained 90% of hemoglobin and 3,636,000 red corpuscles.

Diagnosis. The normal condition of the heart rules out disease or weakness of this organ as the cause of the dropsy. The anemia is so slight that it cannot be due to that. Although the urine contains the slightest possible trace of albumin by the heat test, it is passed in sufficient amounts and shows nothing else abnormal. The trace of albumin is in all probability due merely to a very slight degeneration of the kidneys from toxic absorption. It is well known that such slight degenerative changes do not interfere to any appreciable extent with the function of the kidneys. It is certain, at any rate, that there is no affection of the kidneys sufficient to cause a general dropsy. The dropsy must be due, therefore, in some way to the infectious diarrhea or to the food; that is, it belongs in the class of the so-called IDIOPATHIC DROPSIES, which are really always secondary and whose origin is extremely difficult to explain (see Case 187).

Prognosis. His general condition is reasonably good, his heart is normal, there is but little anemia and the disturbance of his kidneys is trifling. There is no longer blood and mucus in the movements, which shows that in spite of the slight elevation of the temperature the inflammatory condition in the intestines is improving. It is reasonable to expect, therefore, that with improvement in the local condition in the intestines and the consequent improvement in the general condition the causes of the dropsy, whatever they may be, will become inactive and the excess of liquid will be quickly eliminated.

Treatment. Table salt should be cut out of his diet and the intake of liquids limited. Twenty-four ounces of milk in twenty-four hours will be sufficient for him. He should have no extra water. The remainder of his diet should be made up of dry, starchy foods, such as toast, zweibach and

cracker. This diet not only diminishes the intake of liquid, but is also the one most suitable for his intestinal condition. There being no inflammation of the kidneys, it is safe to force them to eliminate more liquid by giving him five grains of theobromine-sodium salicylate, three times daily. If this does not increase the flow of urine, there will be no objection to giving him five minims of the tincture of digitalis, three times daily, increasing it to ten minims, three times daily, if necessary. (See Case 137.)

CASE 189. Lincoln F., fifteen months old, was the second child of healthy parents. There had been no deaths or miscarriages. He was born at full term after a normal labor, was normal at birth and weighed ten pounds. He was nursed for seven months and then given modified cow's milk prepared at home, on which he did very well. Oatmeal water was added to his milk when he was eleven months old, but had to be stopped because it caused hives. He was then put on whole milk and mutton broth. Barley water had recently been added to the milk. He had lost his appetite during the last month, but had had no nausea or vomiting. He had been having from four to five small, green, foul movements, containing small curds and mucus, daily. He had been fussy and had had some colic. He had lost nearly two pounds in weight.

Five days before he was seen all milk had been stopped and he had been put on beef juice, broth, white of egg and cereal jellies. He took his new food well and seemed better for three days, but had been very fussy the last two days, and had had five movements daily. These were loose, very dark in color and had a very foul odor. Swelling of the face appeared the day before, and that morning his hands and feet were also swollen. He was seen at 2 P.M.

Physical Examination. He was well developed and nourished, but rather flabby. His color was fair. The anterior fontanelle was nearly closed. His face was somewhat puffy, especially about the eyes. It was not reddened, but evidently itched. He had three teeth. The gums, mouth and throat were normal, the tongue moderately coated. There was no venous hum in the neck. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal, except that the hands and feet were somewhat swollen. The swelling was not hot or red and did not pit on pressure. There was no spasm or paralysis. The knee-jerks were not obtained. Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was normal.

The urine was high in color, turbid, very acid in reaction, of a specific gravity of 1,024, and contained no albumin or sugar. The sediment consisted of crystals of urate of ammonium.

BLOOD.

Hemoglobin,	65%
Red corpuscles,	5,240,000
White corpuscles,	12,000

Diagnosis. He undoubtedly has a chronic intestinal indigestion and a slight amount of rickets. The condition which requires explanation is the swelling of the face, hands and feet. The analysis of the urine shows that it cannot be due to disease of the kidney, the heart is normal and, while the blood shows a very slight degree of anemia, it is not sufficient to cause edema, and there is no venous hum in the neck. The swelling does not pit on pressure, moreover, and itches, showing that it is not an ordinary edema. It must, therefore, belong in the class of the ANGIONEUROTIC EDEMAS. These are in all probability due to some disturbance of the vasomotor control of the blood vessels. In this instance the edema is almost certainly connected in some way with the intestinal disturbance. It may be due either to irritation of the terminal sympathetic fibers in the walls of the intestines or to the absorption of toxic or chemical irritants from the intestines which act directly on the vascular terminal filaments of the sympathetic. It is, of course, impossible to say which. Its appearance at this time is probably connected with the change of food five days before, since no other element has been introduced. It cannot be due to the broth or jellies, because he has had broth and barley before without the appearance of edema. It must be due, therefore, to either the beef juice or the white of egg. The excessively foul odor of the stools suggests decomposition of the beef juice and the production of toxic substances, while white of egg is known to be the food which most often causes angioneurotic edema.

Prognosis. There is no danger connected with the angioneurotic edema. It is merely a side issue and does not alter the prognosis of the original intestinal indigestion.

Treatment. The first thing to do is to stop both the beef juice and white of egg, either or both of which may be the cause of the swelling. The next thing to do is to give him two teaspoonfuls of castor oil to empty the intestines of the toxic products of the decomposition of the beef juice and egg, which they probably contain. It will be well to stop his food for twenty-four hours, giving him in its place at least one quart of water. Alkalies seem to hasten the disappearance of angioneurotic edema. He should, therefore, be given about a dram of the citrate or acetate of potash or of bicarbonate of soda, in water, during the twenty-four hours. Equal parts of skimmed milk and barley water will be a suitable mixture with which to begin, after the day of water diet.

CASE 190. Robert C., four years old, was the child of healthy parents. He had always been well, except for occasional "colds" and slight disturbances of the digestion. He was taken suddenly sick, during the evening of March 26, with fever, general malaise, headache and pains in the hands and wrists. It was noticed the next morning that his face was turned to the right and that there were large reddish, elevated areas on the backs of the hands and wrists. Similar, but smaller, spots appeared on the thighs and legs during the day. The fever and pain continued, but no new symptoms developed. His appetite was poor and the bowels constipated. He was seen at the Boston Dispensary in the morning of March 28.

Physical Examination. He was well developed and nourished, but a little pale. The throat was normal, the tongue thickly coated but moist. The head was pulled down a little toward the left shoulder and the face turned to the right. All the motions of the neck were limited, but did not cause pain. The left sternocleidomastoid muscle was tense, but not tender. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. There was no spasm or paralysis. The knee-jerks were equal and normal. On the dorsal surface of the hands and wrists were several dark-red areas, varying in size from that of a dime to that of a fifty-cent piece. These were not tender or painful, but were raised one-quarter of an inch or more above the surface and were surrounded by a zone of thickening. There were many smaller spots of the same character about the knees, both behind and in front. They also extended upward on to the thighs and downward on to the legs. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 101° F.; the pulse, 100; the respiration, 24.

Diagnosis. The skin lesions are so characteristic of ERYTHEMA MULTIFORME that it is not necessary to consider any other conditions. The TORTICOLLIS, coming on as it did at the same time as the erythema, is undoubtedly also RHEUMATIC in origin.

Prognosis. The prognosis as to life is, of course, good. The only danger is of the development of some cardiac com-

plication. The torticollis will yield promptly to treatment with salicylic acid. The erythema may be more obstinate. It is possible, but not probable, that new crops may develop in spite of treatment.

Treatment. He should be given five grains of aspirin every four hours until his temperature is normal and the pains have ceased, unless toxic symptoms develop. The dose should then be reduced to five grains, three times daily, in either case, and continued for several days longer. The neck does not require any local treatment. A simple dusting powder, such as one drachm of powdered zinc oxide to one ounce of starch, or stearate of zinc powder, will be all that is necessary for the skin. The bowels should be opened with some simple laxative, like licorice powder or syrup of senna, and his diet limited to milk, broths and starchy foods. He should be made to drink water freely and kept in bed until thoroughly convalescent.

CASE 191. Anita F., six years old, had a mild attack of diphtheria, beginning February 10. Her temperature was never over 100° F., and the constitutional symptoms were slight. She was given 500 units of antitoxin February 11, 3,000 February 14 and 3,000 February 16. Her throat was clear February 21, and a negative culture was obtained February 24. A profuse urticaria, accompanied by a slight rise of temperature, appeared February 26. She had a severe headache and very bad pains in the legs that night, so that she slept but little. The headache ceased on the twenty-seventh, but the pains in the legs continued with undiminished severity. They were less troublesome on the twenty-eighth, but motions of the legs caused much pain. The urticaria reappeared that afternoon. Her temperature had ranged between 101.5° F. and 102.5° F., while her pulse had been about 120. She was seen in consultation at 6 P.M., February 28.

Physical Examination. She was well developed and nourished. Her cheeks were flushed. Her tongue was moderately coated. Her throat was normal, except for slight redness of the fauces. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. She lay with the thighs flexed on the body and the legs on the thighs. She was afraid to have her legs touched, but they could be slowly straightened without causing much pain. Motion at the ankles was free. There was slight swelling and tenderness, but no redness, about the left knee, but none elsewhere. The knee-jerks could not be obtained because of the resistance. There was no enlargement of the peripheral lymph nodes. There were numerous erythematous areas, varying in size from that of a split pea to that of a silver dollar, scattered over the body and extremities. A factitious urticaria was easily produced. The rectal temperature was 103.3° F.; the pulse, 120; the respiration, 30.

The urine was high in color, strongly acid in reaction and of a specific gravity of 1,028. It contained a large amount of urates, but no albumin or sugar.

Diagnosis. The diagnosis of ANTITOXIN POISONING, or serum sickness, is plain in this instance. The latter term, although not in common use in this country, is preferable to

antitoxin poisoning, because the symptoms are not caused by the antitoxin but by the horse serum in which it is contained. Rheumatism, the only other disease which need be considered, can be excluded on the rash, the factitious urticaria and the history of the administration of antitoxin. Severe headache is, moreover, very unusual in rheumatism in childhood. The absence of swelling, redness and marked tenderness in the joints does not count against rheumatism, because these symptoms are comparatively uncommon in rheumatism at this age.

Prognosis. There is no danger as to life or serious inflammation of the joints. The pain and fever will probably persist for a number of days, or perhaps a week, longer. She will probably have a tendency to urticarial eruptions for several months.

Treatment. There is no specific treatment for antitoxin poisoning. The salts of calcium, which were at one time thought to have such an action, are probably inert. The treatment must, therefore, be purely symptomatic. The diet should consist of milk and starchy foods. Eggs must be avoided because of their tendency to produce urticaria. Water should be forced. The application of heat externally and wrapping the legs in cotton will probably help the pains. If they do not, she may be given two and one-half grains each of phenacetin and salol every three or four hours. A mixture of equal parts of alcohol and water or a lotion made up of ten grams of powdered zinc oxide in one hundred cc. of a one-half of one per cent solution of carbolic acid may be used for the itching. If these applications do not relieve it, a saturated solution of camphor in ether may be painted on and allowed to dry.

CASE 192. Evelyn S. was the only child of healthy parents. There had been no deaths or miscarriages. She was born at full term and was normal at birth. She had been very well taken care of and had never been sick. She was nursed for six months, after which she was given a mixture of whole milk and strained oatmeal until she was fourteen months old. Beef juice, broth, rice, eggs, toast, crackers, potato and baked apple had since then been gradually added to her diet. She had never taken more than two slices of bread and one potato daily, and had never been given sugar or sweets. She had been somewhat constipated for two months. Her mother thought that she had drunk rather more water and perhaps passed a little more urine during this time, but would have thought nothing of it if it had not been for the recent symptoms. Two weeks before she was seen in consultation, when twenty months old, she suddenly began to pass a great deal of urine and to be very thirsty. Her mother thought that she drank at least a quart of water daily. She was unable to tell how much urine she passed, but stated that she urinated every few minutes both day and night. The constipation had been more marked and she had lost weight and strength very rapidly. Her appetite and digestion had continued good and her diet had not been changed. She complained constantly of being tired and slept a considerable part of the time.

Physical Examination. She was much emaciated and moderately pale. The skin of the face was dry, but it was not dry elsewhere. The tongue was somewhat dry, but not coated. She had twelve teeth. There was no rosary. The heart and lungs were normal. The abdomen was sunken, but otherwise normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. The cervical and inguinal lymph nodes were just palpable.

The urine was pale, acid in reaction, of a specific gravity of 1,040, and contained the slightest possible trace of albumin. It contained a large amount of sugar, all of which was in the form of glucose. Both acetone and diacetic acid were present

in considerable amounts. The sediment showed nothing abnormal.

Diagnosis. The symptoms are characteristic enough of DIABETES MELLITUS to justify this diagnosis, in spite of her tender age, without an examination of the urine. The findings in the urine confirm the diagnosis and also show that there is an acid intoxication. Alimentary glycosuria can be excluded on the lack of an excess of carbohydrates in the food, the general symptoms of diabetes, the large amount of sugar in the urine and the evidences of acid intoxication.

Prognosis. The prognosis is hopeless. She will probably not live more than a week, certainly not over a month.

Treatment. The general principles of the treatment of diabetes are described in Case 193. It is very difficult to apply them and to regulate the diet in an infant of twenty months, whose food normally consists largely of milk, which contains a large amount of sugar, and starches. It is very hard to select a diet from the limited number of articles of food which are suitable for a baby of this age which will furnish a sufficient number of calories and not contain a large amount of carbohydrates. It is impossible to get along without both milk and starches. The amount of carbohydrates in the starchy foods cannot be diminished in any way. They must, therefore, be entirely excluded from the diet in the beginning. It is possible to use milk by taking advantage of the fact that cream contains a large amount of fat and a relatively small amount of sugar. If cream is diluted until the percentage of fat is no higher than the average infant is able to digest, the percentage of sugar is very low and the caloric value still reasonably high. A quart of whole milk, for example, contains 670 calories and 43 grams of sugar, while a quart of a dilution of one part of 32% cream with four parts of water contains about 600 calories and only 6.5 grams of sugar. A healthy child of her age usually takes nearly 1,200 calories in twenty-four hours. She can undoubtedly get along with 1,000 calories, or even less, for the present. One quart of a one to four dilution of 32% cream will give her 600 calories and 6.5 grams of sugar. The percentage of fat in this mixture, 6.4%, is rather high, but

probably not high enough to disturb her digestion. This must serve as the basis of her diet. She is old enough to digest eggs and beef juice. Two soft boiled eggs and two ounces of beef juice daily will add, respectively, 144 calories and 20 calories, making a total of 764 calories, without increasing the amount of carbohydrates. Broth is also allowable, but has practically no nutritive value. If she is not reasonably satisfied with this amount of food, or continues to lose weight rapidly, it will be necessary to give her more, best in the form of diluted 32% cream, another pint of which will bring the caloric value of her food above 1,000. There is no other way in which the caloric value of her food can be increased as much with so little increase in the amount of carbohydrates, unless food which is certain to upset her digestion is given.

The acetone and diacetic acid in the urine show that she has an acid intoxication. This should be combatted with bicarbonate of soda. She can probably take as much as two drachms a day, perhaps even more. It can be best given in the milk.

CASE 193. Charles W., eleven years old, was the child of healthy parents. One brother was living and well. There had been no deaths or miscarriages. His maternal grandfather had had diabetes, but had died of tuberculosis.

He was born at full term, was normal at birth and weighed six pounds. He had whooping-cough when one year old, mumps and chicken-pox when small, and measles at four years, but had otherwise been well. He had always eaten much candy and had craved sweet foods. He had passed much more urine during the last month than formerly, and had drunk large quantities of water. He had to get up several times at night to urinate and to allay his thirst. His appetite was large. He had had no itching of the skin and no eruption. He was admitted to the Children's Hospital, August 3.

Physical Examination. He was small and sparely nourished. He was moderately pale, but did not look or act sick. His skin was not dry or irritated, and there was no eruption. His tongue was slightly coated, the mouth and throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively. There was no disturbance of sensation. There was no enlargement of the peripheral lymph nodes. He weighed fifty-two pounds.

He was allowed to eat as much as he wanted of the regular hospital diet, but was not allowed to put sugar on his food. He passed 560 ccm. of urine (the normal average is 1,200 ccm.) August 4, of a specific gravity of 1,041, which contained 5.9% or 33.6 grams of sugar. It contained no albumin or acetone, and the sediment showed nothing abnormal.

An accurate account of what he ate was then kept. He took 85 grams of carbohydrates August 6 and passed 855 ccm. of urine of a specific gravity of 1,018, which contained 1.8% or 15.3 grams of sugar, but no acetone.

Diagnosis. There can be no doubt, of course, as to the diagnosis of DIABETES MELLITUS. A simple glycosuria can be excluded on the persistence of the symptoms and the presence of sugar in the urine when there is only a moderate amount of carbohydrates in the food.

Prognosis. There is practically no chance that he will recover, although, judging from the fact that he was able to make use of 70 grams of carbohydrates in twenty-four hours, the disease is not of a very severe type. His expectation of life is probably to be reckoned in months rather than in years, but he may, with careful treatment, live for a number of years. He is, however, very likely to suddenly develop acid intoxication at any time and die after a few days.

Treatment. Drugs are of no use in the treatment of diabetes. The treatment consists in regulation of the diet. The principles are simple. The diet must contain calories enough to supply the caloric needs. The carbohydrates must be cut down until the urine is free from sugar, but no lower than is necessary to accomplish this, because of the danger of the development of acid intoxication. If the acetone bodies appear in the urine when the carbohydrates are cut down, they must be increased again until the acetone bodies disappear. If the amount of the acetone bodies is small, it is safe for a time, however, not to increase the carbohydrates, but to neutralize the acetone bodies by giving bicarbonate of soda. The water should not be limited.

A boy of his size needs approximately 1,300 calories daily. It is a simple matter to lay out a diet for him which will contain the proper number of calories and to regulate the amount of carbohydrates which it contains by the use of the table of food values given in Case 73.

His diet August 13 was as follows:

	Calories.	Carbohydrates.
Cereal, 1½ oz. =	37.5	8.2 grams.
Rice, 1½ oz. =	67.5	15 grams.
Bread, 1 oz. =	75	15 grams.
Meat, 6½ oz. =	390	..
Eggs, 4 =	288.	..
Butter, 3 oz. =	675	..
Tomato, 9 oz. =	...	..
	1,533	38.2 grams.

He passed 530 ccm. of urine of a specific gravity of 1,010, which contained neither sugar nor acetone.

The urine contained acetone the next day, however, although the amount of carbohydrates in the food was the same. The amount of carbohydrates was, therefore, gradually increased, so that on August 17 he was taking 76 grams. He passed on that day 470 ccm. of urine of a specific gravity of 1,026, which contained 2.3% or 10.8 grams of sugar, but no acetone.

It was evident, therefore, that his tolerance for carbohydrates lay somewhere between 38 grams and 76 grams. A little more experimenting showed that he could take about 55 grams of carbohydrates without the appearance of sugar in the urine, and that this amount prevented the formation of the acetone bodies. The diet and the examination of the urine on August 29 were as follows:

	Calories.	Carbohydrates.
Cereal, 1½ oz. =	37.5	8.2 grams.
Rice, 1½ oz. =	67.5	15 grams.
Bread, 2 oz. =	150	30 grams.
Meat, 5½ oz. =	330	..
Eggs, 4 =	288	..
Butter, 1½ oz. =	337.5	..
Broth, 6 oz. =	...	..
Cucumber, 4 oz. =	...	..
	1,210.5	53.2 grams.

He passed 650 ccm. of urine of a specific gravity of 1,016, which contained neither sugar nor acetone.

On this diet he held his weight and had no symptoms. This diet should, therefore, be continued. It is unnecessary to consider the use of any of the so-called "diabetic foods" when he can take as much carbohydrate as at present.

CASE 194. Byron H., thirteen and one-half years old, was the third child of healthy parents. His father denied syphilis and there had been no deaths or miscarriages. There was no history of any similar trouble in either family. He had always been well, except for whooping-cough as a baby and influenza when five years old. He had never had any injuries or symptoms of any disease of the nervous system. He was bright mentally, but rather excitable. He was very active, but did not get tired easily. About a month before he was seen, he began to pass water frequently during the day and had to get up at night to pass it. The increased frequency of micturition was not preceded by any unusual excitement, nervous shock or injury. The frequency of micturition gradually increased for two weeks, since when it had been about the same. Thirst began to be troublesome after the first week. He was passing between one and one-half and two gallons of urine in the twenty-four hours when he was seen, and was constantly drinking water. His appetite was normal, there was no disturbance of the digestion and he was not constipated. He had lost a little weight in the beginning, but had gained half a pound in the last week. He felt a little weary and had a slight headache during the first two weeks, but since then had been perfectly well.

Physical Examination. He was tall and rather slight. His flesh was firm and his muscles were hard. His color was good, but his skin was somewhat dry. He was of a decidedly nervous temperament, but perfectly normal mentally. His pupils were equal and reacted to both light and accommodation. All motions of the eyes were normal and there was no limitation of the field of vision. His hearing was normal. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. The tongue was clean and moist and the teeth were normal. The throat was normal. The area of cardiac dullness was normal, and the second sound at the aortic area was not accentuated. The radial arteries were not thickened and the tension of the pulse was not increased. The lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively.

Kernig's and Babinski's signs were absent. The sensation to touch, pain and temperature was roughly normal. There was no eruption on the skin and there were no scars of any old eruption. There were no mucous patches in the mouth or about the anus and no rhagades. There was no enlargement of the peripheral lymph nodes. He weighed eighty and one-half pounds.

He secreted six ounces of urine in the course of one-half hour while being examined, which was pale, slightly acid in reaction, of a specific gravity of 1,002, and contained no albumin or sugar.

Diagnosis. The fact that the increase in the frequency of micturition preceded the thirst rules out polydipsia as the cause of the polyuria. The absence of remissions or intermissions in the symptoms, of limitation of the field of vision and of disturbances of sensation excludes hysteria as the cause. The age of the child and the acute onset of the symptoms, together with the absence of albumin in the urine, enlargement of the heart, accentuation of the second aortic sound, thickening of the arteries and increase in the pulse tension, show that the polyuria is not a sign of chronic interstitial nephritis. There can be no doubt, therefore, that the trouble is DIABETES INSIPIDUS. The absence of all signs of increased intracranial pressure and of involvement of the cranial nerves, as well as of an injury to the abdomen and of tumors in it, shows that it is of the primary or idiopathic type. Cerebral syphilis being the cause of a considerable proportion of the cases of diabetes insipidus, even when they are apparently primary, a Wassermann test should be done, in spite of the absence of a syphilitic history, of all signs of syphilis and of evidences of cerebral disease, to determine whether it is the etiological factor in this instance.

Prognosis. The chances of recovery are very small, unless the condition is due to cerebral syphilis, in which case they are reasonably good. He will, however, probably live for many years and perhaps attain old age.

Treatment. If the Wassermann test is positive, he should be treated for syphilis. If it is not, it is difficult to decide what drug, if any, to give him. The number of drugs which

have been used and recommended in this disease shows of how little value they all are. Strychnia is perhaps more likely than the others to help him. He should be given one-sixtieth of a grain of the sulphate of strychnia three times daily, the dose being increased until it causes toxic symptoms. It should then be reduced a little below this point and given continuously for several months. If strychnia does not help him, ergot or valerian may be tried. It will be well to attempt to gradually reduce his intake of liquids. The reduction should be carried to the point where the amount of the urine ceases to diminish pro rata. Further reduction will be harmful, in that fluid will be drawn from the tissues to keep up the amount of urine.

CASE 195. Mary B. was the first child of healthy parents. There was no history of abnormal friability of the bones in either family. There had been no previous miscarriages. She was born at full term, after a normal labor lasting nine hours. The presentation was foot and leg. When the leg was pulled down, the mother being under ether, a snap was heard. She was delivered manually, but very little force was used. She was somewhat cyanotic and was held up by the legs to drain. When she was examined it was found that both legs were broken. She was seen in consultation five hours later.

Physical Examination. She was well developed and nourished, of good color and seemed vigorous. The shape of the head was normal. The bones of the skull were hard and the fontanelles and sutures no wider than usual. The face was normal and there was no depression of the bridge of the nose. The shape of the chest was normal and there was no rosary. The heart, lungs and abdomen were normal. The liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The legs appeared shortened in their relation to the trunk, but the arms were of normal length and shape. There was no enlargement of the epiphyses of either the arms or legs. The right femur showed evidences of a healed fracture at about its middle. Union had occurred with an angular deformity outward and forward. There was but little callus and the fracture must have taken place at least three or four weeks before birth. There was a loose fracture with slight crepitus at the junction of the lower and middle thirds of the left femur. There was also a slight anterior bowing independent of the fracture. There was a fracture of the right tibia a short distance above the lower epiphysis, and two fractures of the left tibia, both at some distance from the epiphyses. The fibulæ were intact. There was apparently some forward and outward bowing of the tibiæ, which was not due to the fractures. The fractures were not markedly painful. There was no enlargement of the peripheral lymph nodes. The skin was soft, the hair fine and nothing abnormal was detected about the thymus and thyroid glands.

Diagnosis. Cretinism and chondrodystrophia fœtalis are suggested by the shortening of the legs. There are, however,

no other evidences of cretinism and there is no increase in the friability of the bones in this disease. Chondrodystrophia can be excluded on the shape of the head, the normal length of the arms and the slightness of the shortening of the legs. Osteomalacia is a disease of later life. Fetal rickets, provided there is such a condition, can be ruled out on the normal condition of the skull and the absence of a rosary and of enlargement of the epiphyses. Rachitic bones, moreover, are soft and bend but do not break or, if they do, the fractures are of the green-stick variety rather than complete as in this instance. The only condition with which the lesions in this baby are consistent is OSTEOGENESIS IMPERFECTA, also known as idiopathic osteopsathyrosis and fragilitas ossium. This is undoubtedly the diagnosis.

Prognosis. The prognosis as to life is grave, in spite of the good general condition, because the majority of the babies who are born with this disease die in early infancy. If she survives, she will undoubtedly continue to have repeated fractures from the most insignificant causes. The fragility of the bones gradually diminishes, however, and is much less marked after puberty than before it. The individual fractures heal quickly, and, if they are carefully treated, without deformity.

Treatment. She must be kept on a pillow and handled as little as possible. The clothes must be so arranged that they can be put on and taken off without disturbing the arms. She should not be put in a tub, but must be bathed on the pillow. She ought not to be put to the breast, but should be given breast-milk from a bottle. The fractures should, of course, be reduced and splinted in the usual way. There is no evidence to show that this disease is due to a deficiency of calcium. There is, therefore, no indication for its administration. Good results have been claimed from the use of phosphorus in this condition. It ought, therefore, to be given a trial. It is very likely to disturb the digestion, however, and on this account must be given very cautiously. It will be wise, therefore, to wait for some weeks before beginning it. The most reliable preparation is the phosphorated oil. The initial dose should be one-quarter of a minim, three times daily.

CASE 196. Lena M. was the only child of healthy parents. There had been no miscarriages and the parents stated that they never had any venereal disease. She was born at full term, after a normal labor, and was normal at birth. She was fed on condensed milk during the first year and did well. She had had no disturbance of the digestion since then. In November, 1904, when a little more than three years old, she began to complain of pains in the axillæ, for which no cause could be found. She had no pains elsewhere. She lost her appetite, became very thin and finally got so weak that she could not walk. She also had feverish spells every few days. This condition lasted until June, 1905, when the pains and fever suddenly ceased and her appetite returned. She gained as rapidly as she had lost in the beginning and was soon perfectly well. She remained well until February, 1906, when she had the measles. This was followed by the suppuration of a gland in the neck, which, however, soon healed. About the middle of March the pains in the axillæ returned and in a few days pains developed all over the body. She lost her appetite and again began to fail rapidly in flesh and strength. Swelling of the joints of the fingers appeared in two weeks. The wrists and knees next became swollen and finally the elbows and feet. The swelling of the joints varied from time to time, but never disappeared. Spontaneous pain ceased after a time, but pain on motion and handling persisted. She had seemed feverish at times, but, as a rule, there had apparently been no fever. There had been no disturbance of the digestion and her bowels had moved normally. Her appetite had improved during the last two weeks and she had regained a little weight. She was admitted to the Children's Hospital in August, 1906, when five years old.

Physical Examination. She was poorly developed and emaciated. Her skin was brownish. There was no aural or nasal discharge. The tongue was clean, the teeth in fair condition, the throat normal. She held her head rigidly in the median line and all motions of the head were much limited. She opened her mouth voluntarily only about one cm., but it could be forced open about twice as far. A Roentgeno-

graph of the cervical spine and the maxillary articulations showed nothing abnormal. The whole back was rigid and all motions were limited. The area of the cardiac dullness was normal, as was the action of the heart and the sounds, except for a soft, systolic murmur in the pulmonic area. The second pulmonic sound was not accentuated and there was a venous hum in the neck. The lungs and abdomen were normal. The liver was palpable one cm. below the costal border in the nipple line. The spleen was just palpable. There were fusiform swellings, which were slightly reddened and tender to pressure, about the elbows, knees, carpal, metacarpocarpal and metatarsotarsal joints, all the phalangeal joints of the hands, except the second joints of the two middle fingers and the distal joints of the thumbs, and the maxillary. The movements of all these joints were limited and painful. Roentgenographs of the hands showed enlargement of the distal portions of the two proximal phalanges, except of those not clinically affected, which was due to a proliferation of the periosteum, and slight blurring of the epiphyseal centres of the affected portions. The legs were held flexed at a right angle on the thighs. There was no limitation of motion at the hip and shoulder joints. There was much wasting of the muscles of both the arms and the legs. The knee-jerks were present, but diminished. There was no disturbance of the sensation to touch and pain. There was a general enlargement of the peripheral lymph nodes, including the epitrochlear and occipital, which varied in size from peas to almonds. There were no rhagades or mucous patches and no eruption or scars of former eruptions. The rectal temperature was 99° F.; the pulse, 120.

The urine was normal in color, acid in reaction, of a specific gravity of 1,023 and contained no albumin, sugar or acetone.

BLOOD.

Hemoglobin,	50%
Red corpuscles,	3,700,000
White corpuscles,	13,000
Mononuclears,	20%
Polynuclear neutrophiles,	79%
Mast cells,	1%

LENA M. Case 196.

Diagnosis. The appearance of the swellings in the joints after measles and an abscess of the neck, the number of the joints involved, the fusiform character of the swellings, the enlargement of the spleen and peripheral lymph nodes, the anemia, the discoloration of the skin and the relative increase in the rate of the pulse in comparison with that of the temperature are all so characteristic of that form of infectious arthritis known as STILL'S DISEASE that there is no opportunity for a differential diagnosis from other forms of arthritis. The absence of changes in the bones and cartilages of the affected joints, as shown by the Roentgenographs, confirms this diagnosis. The systolic murmur at the pulmonic area and the venous hum in the neck are merely signs of the anemia, while the slight enlargement of the liver is probably due to fatty change resulting from the disturbance of the nutrition.

Prognosis. There is no danger as to life. The process is likely to continue for many months or even for a number of years, however, perhaps skipping from joint to joint. She will then recover her health and the swellings will in a great measure disappear, but she will probably be left with more or less deformities as the result of adhesions and thickening about the joints.

Treatment. The salicylates and iodides are useless in this disease. In this instance there are no symptoms which point to the digestive tract as the source of the toxemia. There are, therefore, no definite indications as to what she should or should not eat. She ought, therefore, to be given a liberal, easily digestible diet. Meats and foods prepared from them are not contraindicated. It is very possible that there is a mild bacterial infection at the bottom of the trouble. Unfortunately, experience has shown that blood cultures are almost invariably negative and the liquid aspirated from the joints sterile in this disease. It being, therefore, impossible to determine the organism, and as only an autogenous vaccine can be expected to do good, it hardly seems rational to give stock vaccines of many organisms on the chances that one of them may be the right one. She should be given iron for the anemia. The saccharated carbonate is a

good preparation. Five grains, three times daily, should be sufficient for her. She should be put on a frame with traction on the legs and the affected joints baked daily. The further treatment should be directed by an orthopedic surgeon.

CASE 197. Paul K., nine months old, was the second child of healthy parents. There had been no deaths or miscarriages and no known exposure to tuberculosis. He was born at full term, after a normal labor, and was normal at birth. He was not nursed and some difficulty was experienced in feeding him up to the time he was three months old, since when he had thrived in every way. He began to be sick about August 1. He was fussy and evidently in pain. He vomited a little at first, but this stopped when his food was weakened. He had had no disturbance of the bowels. His mother noticed August 16 that he "favored" his left leg a little. He was first seen by his physician, August 19. He found a temperature of 100° F., but nothing abnormal on physical examination. The temperature had ranged between 99° F. and 101° F. since then. He was very fussy and it was evident that he was in pain. The physician was, however, unable to locate its seat. He slept much better than usual the night of August 22, and the next morning his mother found that his left thigh was much swollen. Both she and the physician were sure that it was not swollen the day before. In spite of the swelling, he seemed more comfortable than for several days. He was seen in consultation at 4 P.M., August 23.

Physical Examination. He was pale and feeble and had evidently lost much weight. He was evidently in considerable pain. The anterior fontanelle was four cm. in diameter and depressed. The pupils were equal and reacted to light. There was no rigidity of the neck or neck sign. The eardrums were normal. He had two teeth. The mouth, gums and throat were normal. There was no rosary. The heart, lungs and abdomen were normal. The spine was flexible. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The arms and right leg were normal. He lay with the left thigh flexed on the body and rotated outward and the leg flexed on the thigh. The left thigh was much and somewhat irregularly swollen. The swelling was most marked in the upper portion and did not extend on to the abdomen or leg. It was not in the superficial tissues and did not pit on pressure. It was moderately tender, but not red or hot. The whole left lower extremity was mottled, but the

pulse was palpable in the foot. All motions at the left hip were much limited and painful, those at the knee were free. The right knee-jerk was normal and Kernig's sign was absent on that side. They could not be determined on the left, because of the rigidity. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100.4° F.; the pulse, 160; the respiration, 32.

The urine was of normal color, clear, acid in reaction and contained no albumin.

Diagnosis. Rheumatism can be excluded on the age of the baby and the location of the swelling. Scurvy can be excluded on the localization of the swelling over one bone, the sudden appearance of the swelling, the absence of tenderness elsewhere and the normal condition of the gums. The long continuance of pain and fever without any local manifestations, except a little unwillingness to use the left leg, and the sudden appearance of the swelling with the simultaneous diminution in the pain, is almost pathognomonic of the rupture of a collection of pus which has been slowly accumulating. The location of the swelling shows that the abscess was located somewhere in the neighborhood of the hip joint. It was in all probability in the joint itself and, judging from the size of the swelling, also in the pelvis. When the capsular ligament ruptured, the pus escaped into the neighboring tissues. The diagnosis of ACUTE ARTHRITIS OF INFANTS is, therefore, justified. The acute arthritides at this age are very seldom tubercular. They are in most instances due to an infection of the bone, usually in the neighborhood of the epiphyseal line, with one of the pyogenic organisms, the joints being involved secondarily. This is probably the case in this instance.

Prognosis. The condition is a very serious one. He is in reasonably good shape, however, and there are no evidences of general sepsis or of the involvement of other bones or joints. There is a reasonable chance of his recovery, therefore, provided he is operated on at once. If he survives, he will almost certainly have a useful joint.

Treatment. The abscess cavity must be opened, cleaned out and drained.

CASE 198. Penelope C., eleven months old, had had much trouble with her digestion until she was six months old, when a wet-nurse was procured for her. She had done uninterruptedly well since then and was still on the breast. She had cut three teeth without any marked discomfort or disturbance of any sort. She began to be fussy and to put her hands in her mouth, September 3. She fussed, cried out and kept putting her hands in her mouth all through the night of September 6. Her temperature at midnight was 103° F. She was a little more quiet the next day, but refused to nurse. She did not vomit, however, and had two normal stools during the day. She was seen at 4 P.M., September 7.

Physical Examination. She was well developed and nourished and of good color, but was very fussy and irritable. She kept crying out as if in pain and was constantly putting her hand in her mouth. The anterior fontanelle was two cm. in diameter and level. There was no rigidity of the neck or neck sign. The pupils were equal and reacted to light. The ear-drums were normal. There was no nasal discharge or obstruction. She had three teeth. The gum was much swollen and reddened over the left upper middle incisor, which was apparently on the verge of erupting. The tongue was clean and the throat normal. There was no rosary. The heart, lungs and abdomen were normal. The lower border of the liver was palpable two cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. There was no eruption. The rectal temperature was 101° F.; the pulse, 112; the respiration, 28.

The urine was clear and contained no albumin or sugar.

The leucocytes numbered 10,000.

Diagnosis. Otitis media, which is strongly suggested by the symptoms, can be excluded on the absence of all signs of nasopharyngeal irritation, the normal white count and the normal condition of the ear-drums. Pyelitis, which often causes fever and symptoms of discomfort without physical signs at this age, is ruled out by the low white count and the

normal condition of the urine. Tubercular meningitis, which must always be considered when a baby is ill and there are no definite symptoms except fever and irritability, seems very improbable in the light of the physical examination. It cannot be excluded, however, unless some more reasonable explanation of the symptoms can be found. There are no symptoms pointing to disease of the gastrointestinal tract. The low white count shows that there is no hidden inflammatory process going on and the physical examination shows nothing abnormal except the swelling and redness of the gum. In the absence of all symptoms and physical signs of other conditions it seems fair to conclude, therefore, that this is the seat of the trouble and to make a diagnosis of DIFFICULT DENTITION. The fussiness and the constant putting of the hands to the mouth point strongly, moreover, to discomfort there. The fever may easily be caused by reflex irritation from the swollen gum.

Prognosis. The symptoms will probably cease at once when the gum is lanced and the pressure relieved.

Treatment. The gum should be lanced at once.

CASE 199. Harold C., five years old, had always been well except for whooping-cough at two years, scarlet fever and chicken-pox at three years and measles two months before. He was admitted to the Children's Hospital, July 20, three days after the onset of an infectious diarrhea. The physical examination and the urine were normal at that time. He had only a moderately severe attack of the disease, but lost much weight and strength. The character of the stools began to improve August 3, as did his general condition. The temperature reached normal a week later and there was no longer blood in the stools. Everything seemed to be going well, except that from time to time he had a little fever. The movements had diminished to two a day and he was beginning to sit up in bed. It had from the first been very difficult to keep his mouth clean, but there had been no ulcerations. His mouth continued to be dirty and the odor from it was very foul. A sloughing area, the size of a dime, was noticed on the inside of the left cheek about noon, September 2. It had not increased in size when he was seen the next morning, but the cheek had become much swollen during the night and a profuse, very foul-smelling discharge from the mouth had appeared. He apparently had no pain.

Physical Examination. He was thin and pale. He was perfectly clear mentally, but somewhat apathetic. The left cheek was much swollen, but not red or hot and only slightly tender. There was a profuse, very foul-smelling discharge from the mouth. The whole of the inside of the mouth was reddened, but there were no ulcerations, except in the left cheek, where there was a sloughing area, the size of a dime. Several of the teeth on this side were much decayed. The throat was normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal, as were the superficial and deep reflexes. The lymph nodes on both sides of the neck were enlarged, more so on the left. The rectal temperature was 100° F.; the pulse, 130; the respiration, 30.

Diagnosis. The location of the sloughing area, the marked swelling of the cheek without heat or redness, the foul odor of the discharge, the relatively low temperature and the onset

of the trouble during the convalescence from an acute disease are so characteristic of NOMA that it is unnecessary to consider any other condition.

Prognosis. The prognosis is very grave. He may recover, but in all probability the process will extend and he will die of exhaustion and bronchopneumonia in the course of three or four days.

Treatment. The sloughing area should be thoroughly burned out at once with the actual cautery. The mouth should be cleansed several times daily with a solution of peroxide of hydrogen in order to diminish the chances of the development of a secondary bronchopneumonia. This solution is also especially useful because the Bacillus fusiformis, the probable cause of noma, is anaerobic. He should be given as much fresh air as possible, preferably out of doors, and fed freely with milk, gruel, cereal jellies, junket and milk toast. He must be fed with a tube, passed through the nose, if he will not take sufficient nourishment otherwise. Stimulation is not needed at present, but probably will have to be started by to-morrow.

CASE 200. Joseph W. was the child of healthy parents. Three other children were well and one had died of diarrhea in infancy. There had been no miscarriages. He had had no known exposure to tuberculosis. He was born at full term, after a normal labor, and, except for whooping-cough at three years, had been well until he was five and one-half years old. He then began to complain of pain in the abdomen, and it was noticed soon after that his abdomen was larger than in the past. The abdomen had slowly increased in size since then and he had had pain in it from time to time. His appetite was not very good, but he did not vomit and his bowels moved regularly. He did not gain in either height or weight, did very poorly at school and did not care to play with other children. His mother thought that he was usually a little feverish at night. He was admitted to the Children's Hospital when seven years old.

Physical Examination. He was fairly well developed and nourished and of good color. The heart and lungs were normal. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line; the lower border was not palpable. The spleen was not palpable. The abdomen was considerably enlarged and there was a rounded prominence in the epigastrium. Palpation revealed a mass about the size and shape of a large egg-plant, with the small end down, in the upper abdomen. It extended about three cm. below the navel and further to the right than to the left of the median line, but did not reach the costal border. Its anterior surface was close to the abdominal wall. It was flat on percussion and not tender. It was freely moveable laterally and downward but did not move with respiration. Its surface was smooth and it felt hard, but somewhat elastic. The rest of the abdomen and the flanks were tympanitic. The kidneys were not palpable and nothing abnormal was detected in the flanks. The genitals were normal, as were the extremities. A few lymph nodes, the size of beans, were palpable in the neck and groins. There was no evidence of enlargement of the bronchial lymph nodes. Rectal examination showed nothing abnormal. The rectal temperature was 99° F.

The urine was clear, acid in reaction, of a specific gravity of 1,018 and contained neither albumin nor sugar. The sediment showed nothing but a few small round and squamous cells.

BLOOD.

Hemoglobin,	90%
Red corpuscles,	5,368,000
White corpuscles,	9,900
Mononuclears,	45%
Polynuclear neutrophiles,	54%
Eosinophiles,	1%

The red corpuscles showed nothing abnormal.

A skin tuberculin test was very strongly positive.

Diagnosis. The strip of tympanitic resonance between the tumor and the costal border and the fact that it does not move with respiration show that it cannot be connected with the liver. Tumors of the spleen are not of this shape, are not moveable downward and come out from under the costal border. Tumors of the kidney come up into the abdomen from the flanks, which, in this instance, are empty. It cannot, therefore, be a tumor of either the spleen or kidneys. These are, moreover, solid tumors, while this tumor has the shape and feel of a cyst. It cannot be a cyst of the pancreas, because it is superficial and freely moveable. The only other cysts which occur in this region are those of the mesentery. The mobility is consistent with this condition. The tumor is, therefore, almost certainly a CYST OF THE MESENTERY. These cysts are, as a rule, due to obstruction of the lymph vessels, but are sometimes collections of pus resulting from the breaking down of tubercular mesenteric lymph nodes. The low white count and the normal temperature are consistent with either condition. The strongly positive tuberculin test, in the absence of signs of tuberculosis elsewhere, unless the slightly enlarged lymph nodes in the neck and groins are such, suggests, but does not prove, that it is the latter. There is no way of settling this point except by operation.

Prognosis. He is in good general condition and the physical examination shows nothing abnormal outside of the abdo-

men. He should, therefore, stand an operation well. It ought not to be, moreover, a very difficult matter to remove the cyst. If it is not tubercular, its removal will cure him. If it is tubercular, it is very probable that there are some other tubercular lymph nodes elsewhere in the body which will not, of course, be removed. The prognosis of tubercular adenitis at this age is, however, very good with proper care and treatment.

Treatment. The treatment is immediate operation.

INDEX

The heavy face numerals refer to the pages on which the disease named is the diagnosis of a case; the other figures to the pages on which the disease or condition is mentioned.

Abdomen, examination of **35.**
  tumor of, 248, 285.
Abscess, 74.
  epigastric, 111.
  of brain, 562.
  of lung, 356.
  of skull, 567.
  peritonsillar, 336.
  retropharyngeal, 21, 301, **336,** 575, 579.
Acid intoxication, 130, 583, 609, 610, 612.
Adenitis, bronchial, **589.**
  cervical, **585.**
    (See lymph nodes.)
Adenoids, 18, 25, 301, **330, 331,** 339, **358,** 462, 575, 579, 586.
  examination for, **22.**
Amyotonia congenita, **569.**
Anemia, 50, 435, 437, 466, 469, 472, 477, 490, 596, 599, 602, 621.
  chlorotic type, 466.
  infantum pseudoleukemica, 473.
  pernicious, 469, 470, **478.**
  secondary, **227, 232,** 260, 347, **466, 470,** 472, 477, 478, 483, 493.
  secondary, with splenic tumor, **473.**
  splenic, **486,** 494.
Aneurism, 119.
Angioneurotic edema, 50, 531, 592, 593, **602.**
Antitoxin poisoning, **606.**
Antrum, maxillary, 22.
  mastoid, 23.
Anus, fissure of, 40, **161.**
Appendicitis, 111, 164, 196, **197,** 199, **200,** 248, 251, 285, 286, 373, 442.
Appendix, position of, **39.**
Arthritis, acute, of infants, **624.**
  infectious, **621.**
  septic, 45.
Ascites, 37, 244, 431, 437, 447.
  causes of, 244.
  characteristics of fluid in, 245.
  physical signs of, 244.
Asthma, **358, 361.**
Atelectasis of lung, **83,** 224, **225.**
Babinski's phenomenon, **46.**
Bacteriuria, 442, 453.
Banti's disease, **494.**
Baths, fan, 378.
  pack, 378.
  sponge, 377.
Bednar's Aphthæ, 18, **299.**
Bile ducts, congenital obliteration of, **71,** 90, 91.
  obstruction of, 437.
Bladder, capacity of, **42.**
  position of, **42.**
Blood, characteristics of, **52, 53, 54.**
Blood pressure, **29.**
Bow-legs, 43.
Brain, abscess of, 562.
  tumor of, **563,** 567.
Branchial cyst, 67.
Breasts, engorgement of, 25, **89.**
Breck feeder, 65.
Bronchitis, 224, 225, 256, 260, 282, 283, 290, 326, 336, **349, 351, 353,** 356, **361,** 364, **367, 460,** 539.
Bronchopneumonia, 224, 225, 254, 260, 349, 351, **364, 367,** 589.
Bronchus, foreign body in, **356.**
Brudzinski's neck sign, **47.**
Calculi, renal, 445.
  vesical, 239.
Calories, use in infant feeding, 139, 176, 188, 191, 194, 202, 214, 216, 219, 222, 241, 474, 597, 609.
  use in older children, 142, 179, 182, 233, 280, 318, 448, 449.
  method of calculation in infant feeding, 214.
  table of caloric values, 449.
Caput succedaneum, 74.
Cephalhematoma, **74.**
Cerebellar tumor, **563.**
Cerebral hemorrhage, 106, **534,** 537.
Cerebral paralysis, 46, 77, 122, 125, 305, 508, 519, 526, 535, **537,** 559.
Cerebral tumor, 563, 567.
Cerebrospinal fluid, normal, 264, 265.
  in meningitis, 264, 265.
Chest, anatomy of, **24.**
  growth of, **14.**
  position in examination of, **26.**
Chicken breast, **26.**
Chicken-pox, **311.**
Chlorosis, 466.
Cholecystitis, 164.

Cholera infantum, 116, **204.**
Chondrodystrophia fœtalis, 618, 619.
Chorea, 416, 423, 495, 496, **505.**
Chvostek's symptom, **48.**
Cirrhosis of liver, 431, 434, **437,** 486, 493, 494.
Cœcum, position of, **39.**
Colic, lead, 37.
Colitis, 37.
Colon, position of, **39.**
Colostrum, 25.
Congenital atelectasis of lungs, **83.**
cerebral defect, 537.
dilatation of the colon, **144.**
dislocation of hip, 44.
heart disease, 82.
icterus, 90, 91.
laryngeal stridor, **85,** 339.
malformation of bile ducts, **71,** 90, 91, 167.
malformation of esophagus, **88.**
malformation of intestine, **69.**
muscular hypertonia, 106.
Constipation, 137, 143, 150, 155, 156, **157, 161,** 175, 191, 192, 214, 220, 270, 373, 374, 528, 571, 608.
Convulsions, 339, 342, 343, 376, 377, 501, 502, 504, 507, **508,** 515, 531, 532, 540, 541, 581, 583.
Craniotabes, **16.**
Creeping, 43.
Cretinism, 17, 19, 23, 514, 519, **573,** 617, 618.
Croup, spasmodic, 333.
Curve of weakness, **24,** 227.
Cyanosis, enterogenous, 405.
Cyst, branchial, 67.
mesenteric, **630.**
ovarian, 244.
Cystic hygroma of neck, **67.**
Dentition, 20.
delayed, 531.
difficult, 328, **626.**
Diabetes insipidus, **615.**
Diabetes mellitus, **609, 611.**
Diaphragm, position of, **26.**
Diarrhea, 294.
classification of, 115, 116.
cholera infantum, 116, **204.**
dysenteric type, 116, **202,** 240.
fermentative, 116, **172,** 175.
infectious, 116, 147, 175, **202,** 241, 599.
nervous, 115.
Diastasis of recti muscles, 37.
Diphtheria, 235, **288, 290,** 442.
laryngeal, **290,** 333, 356.
nasal, **288,** 301.
paralysis in, **557.**
intubation in, 291.
Dropsy, idiopathic (see idiopathic edema).
Ear, examination of, **22.**
Edema, 50, 93, 450, 602.
angioneurotic, 50, 531, 592, 593, **602.**
idiopathic, **596, 599.**
of lungs, 83, 423, 427, 549.
Emphysema of lungs, **358,** 381, 385.
Empyema (see pleurisy, purulent).
Encephalitis, 342, 541, 546, **547,** 562.
Endocarditis, 324, 364.
acute, **411,** 414, 415, 416, 417, **418,** 420.
malignant, 414, **415.**
Enuresis, nocturnal, **462.**
Epilepsy, 342, 501, **502, 504,** 508.
Epiphysitis, acute, 305.
syphilitic, **306.**
Epstein's pearls, **18.**
Erysipelas, **113.**
Erythema, 317.
Erythema multiforme, **604.**
Erythremia, 405.
Erythrocytosis megalosplenica, 405.
Esophagus, 21.
congenital malformation of, **88.**
spasm of, 120.
stricture of, **120.**
Extremities, deformities of, **43.**
examination of, **43, 44, 45.**
growth of, **13.**
position of, **45.**
size of, **45.**
spasm of, 45.
Eyes, 23.
reaction to accommodation, 23.
reaction to light, 23.
Face, growth of, **17.**
Facial phenomenon, **48.**
Faculties, development of, 49.
Fat (see infant feeding).
Fédé's disease, 19.
Feeding (see infant feeding).
Fissure of anus, 40, **161.**
Fontanelles, **15.**
Fragilitas ossium, **618.**
Friction sounds, pleural, 35.
Gall bladder, examination of, 40.
inflammation of, 164.
Gallstones, 164.
Genitals, examination of external, 42.
German measles, 314, 315, **316,** 317.
Glands (see lymph nodes).
Glioma, 563.
Glycosuria, alimentary, 609, 611.
Grasping, 43.
Grocco's sign, 32.
Growth, in height and weight, **11, 12.**
of chest, **14.**
of face, **17.**
of head, **14.**
relative of extremities and trunk, **13.**
Habit spasms, **496.**
Hair, **16.**
Harrison's groove, **26.**
Head, growth of, **14.**

Head, shape of, **14.**
Hearing, 23.
Heart, area of, **28.**
examination of, **27.**
impulse of, **27.**
sounds of, **29.**
Heart disease, 583.
acute endocarditis, **411,** 414, 415, 416, 417, **418,** 420.
aortic insufficiency, 417.
chronic valvular disease, 400, 403, 408, **417,** 423.
congenital, 82, **400, 403, 406,** 579.
dilatation, 364, 409, 420, 423.
functional, 403, 408, **409,** 411, 437, 447.
malignant endocarditis, 414, **415.**
mitral insufficiency, 417, **426.**
mitral stenosis, **426.**
myocarditis, 411, 417, 418, **420,** 427.
Hematoma of the sternocleidomastoid muscle, **80.**
Hematuria, 238, 239, **445,** 458.
Hemophilia, 99, 100, 102, 103, 477.
Hemorrhage, cerebral, 106, **534,** 537.
Hemorrhagic disease of the new-born, 38, 43, **99, 103.**
Hemorrhoids, 40.
Henoch's disease, 592.
Hernia, epigastric, 37.
inguinal, 42, 72.
umbilical, 38.
Hip, congenital dislocation of, 44.
Hirschsprung's disease, **144.**
Hodgkin's disease, 480, 486, **490,** 493.
Hydrocele, of cord, 42.
encysted, of cord, 73.
Hydrocephalus, 14, 15, 16, 227, 526, 529, 534, 566, 567.
chronic internal, 267, **522, 525, 528.**
Hydronephrosis, 458.
Hypertonia, congenital muscular, 106, 122.
Hypospadias, 43.
Hysteria, 37, **565,** 615.
Icterus (see jaundice).
congenital, 90, 91.
neonatorum, **91,** 167.
Idiocy, 569.
amaurotic, 514, **516,** 519.
hydrocephalic, 514, 519.
microcephalic, **514,** 519.
Mongolian, 17, 19, 514, 519, **520.**
Incontinence of feces, **156.**
Indigestion, 218, 263, 278, 282, 317, 328, 331, 342, 370, 376, 498, 589, 593, 626.
acute duodenal, 90, 91, **164, 167,** 196.
acute gastric, 127, 133, **134,** 150, 164, **188,** 270.
acute intestinal, **188,** 270.
chronic duodenal, 36, 71, **169,** 437.
Indigestion, chronic gastric, 122, 125, **137, 141,** 595.
chronic intestinal, 116, 137, 141, **175, 178, 181, 186, 232,** 338, 595, 602.
intestinal, disturbance of equilibrium, 115, 171, **175, 188, 190, 193.**
intestinal, fermentative type, 116, **172,** 175.
Infant feeding, breast, 123, 138, 167, 173, 175, 186, 191, 193, 215, 219, 221, 222, 225, 241, 340, 354, 435, 470, 529, 583, 597, 618.
boiling, disadvantages of, 236.
calculation of calories, 214.
cow's milk, idiosyncrasy to, 138.
pasteurization, disadvantages of, 239.
results of excess of fat, 139, 157, 172, 175, 190, 215.
results of excess of proteids, 186, 193.
results of excess of salts, 596.
results of excess of starch, 138, 596.
results of excess of sugar, 138, 188.
results of insufficient food, 215.
results of insufficient proteids, 219.
use of albumin water, 202, 603.
use of alkalies, 123, 139, 173, 176, 191, 194, 222, 229, 283, 474, 529, 597, 603.
use of calories, 139, 176, 188, 191, 194, 202, 214, 216, 219, 222, 241, 474, 597, 609.
use of low fat, 123, 139, 173, 175, 191, 215, 435, 597.
use of pancreatization, 139, 194, 236.
use of proteids, 188, 215, 219, 435, 597.
use of salt, 597.
use of starch, 173, 194, 202, 205, 215, 216, 236, 340, 467, 597, 603.
use of sugar, 173, 175, 191, 193, 202, 205, 236, 340, 435, 597.
use of whey, 123, 135, 173, 529, 597.
use of whey proteids, 123, 139, 173, 176, 194.
Infantile atrophy, 215, 218, **241,** 260.
Influenza, 133, 257, 278, 279, 280, 282, 292, **293,** 326, 377, 430, 539.
Intestinal obstruction, 130, 199.
Intestinal toxemia, 199, 204, 272, 317, 434, 502, 534, 593, 602.
Intestine, congenital malformation of, **69.**
Intoxication, acid, 130, 583, 609, 610, 612.
intestinal, 199, 204, 272, 317, 434, 502, 534, 593, 602.
Intussusception, **147, 150, 154,** 202, 593.
Irrigation of bowels, method, 203.
Jaundice, 70, 86, 90, 108, 164, 167, 397, 436, 437.
Kernig's sign, **47.**

Kidney, amyloid disease of, 460.
floating, 42.
sarcoma of, 37, 238, 239, 445, **458.**
stone in, 445.
tuberculosis of, 238, 445.
tumors of, 42, 630.
Kidneys, examination of, **41.**
passive congestion of, 431.
position of, **41.**
Knee-jerks, examination of, **46.**
Knock-knees, 43.
Koplik's spots, **19,** 313, 314, 315, 316.
Lachrymal glands, 23.
Laryngismus stridulus, 85, **339,** 508, 531, 532, 579.
Laryngitis, catarrhal, 290, **333,** 339, 360, 582.
diphtheritic, **290,** 333, 339, 360.
Laughing, 49.
Lavage method, 134.
Lead, colic, 37.
poisoning, 593.
Leucocytosis, digestive, 53.
Leukemia, 477, 489, 586.
acute lymphatic, 440, 470, **480, 483,** 486.
Lips, **17.**
Liver, abscess of, 437.
amyloid, 385, 434.
cirrhosis of, 431, 434, **437,** 486, 493, 494.
examination of, **40.**
fatty, 385, 434, **435,** 621.
malignant disease of, 434, 437, **440.**
position of, **40.**
sarcoma of, **397, 440.**
syphilis of, 437.
Lungs, abscess of, 356.
edema of, 83, 423, 427, 549.
examination of, **30.**
gangrene of, 356.
percussion of, **30.**
position of lobes, **31.**
resonance of, **30.**
sarcoma of, **398.**
sense of resistance, **32.**
Lymph nodes, abdominal, 245, 285, **286,** 458, 630.
axillary, 585.
bronchial, 30, 85, 364, **589.**
cervical, 79, 323, 408, 489, **585,** 586.
epitrochlear, 48.
general enlargement of, 48, 440, 472, 621.
inguinal, 72, 585.
local enlargement of, 48.
occipital, 48.
tracheo-bronchial, 48, 119, 260, 326, 356, 490, 575, 579, 585, **589.**
Macewen's symptom, **16.**
Malaria, 278, 282, 292, **295,** 347, 414, 452, 469, 493.
Malformation, congenital, of intestine, **69.**
Malformation, congenital obliteration of bile ducts, **71,** 90, 91.
congenital, of esophagus, **88.**
of nose, 301.
Malnutrition, 116, 137, 190, 192, 214, 218, 241, 253, 260, 434, 472, 473, 569, 580, 621.
from excess of carbohydrates, 116, **188.**
from excess of fat, 116, **190.**
from excess of proteids, 116, **193.**
from insufficient food, **215, 221.**
from insufficient proteids, **219.**
Mastitis, 89.
Masturbation, 511.
Measles, 249, 282, **313,** 314, 315, 316, 364, 367, 390, 546.
Meckel's diverticulum. 38.
prolapse of, 94, **97.**
Mediastinitis, 430.
Meningitis, 37, 106, 130, 172, 263, 267, 276, 279, 292, 301, 342, 370, 377, 455, 456, 531, 534, 539, 541, 546, 547, 551, 582.
cerebrospinal, 130, 133, 263, 264, 267, 270, 271, **273, 276,** 278, 280, 293, 377, 455, 525, 541, 566.
cerebrospinal fluid in, 264, 265.
influenza, **539.**
pneumococcus, **541.**
serous, 534, **543.**
tubercular, 130, 164, 196, 263, **264,** 267, **268,** 270, **271,** 273, 276, 278, 293, 539, 541, 543, 546, 626.
Meningocele, 67, 74.
spinal, 67.
Mesentery, cyst of, **630.**
Methemoglobinemia, 405.
Microcephalus, **514.**
Mouth, examination of, **17.**
Mucous polyp, 38.
Mumps, 282, **323.**
Muscular dystrophy, 569.
Myelitis, transverse, 537.
Myocarditis, 321, 364.
Nasopharyngitis, 575, 579, 582, 625.
Nasopharynx, anatomy of, **22.**
examination of, **22.**
Navel, 37.
granuloma of, 38, **94,** 96.
mucous polyp of, 38.
Neck, anatomy of, 23.
in cretinism, 23.
cystic hygroma of, **67.**
Neck sign, **47.**
Nélaton's line, 44.
Nephritis, acute, 321, 324, 445, **447.**
chronic, 442.
chronic interstitial, 442, 460, 615.
chronic parenchymatous, 442, **460.**
degenerative, 248, 583, 599.
Neuritis, multiple, 235, 305, 537, 551, 555, 556, **557,** 559.

New-born, cerebral hemorrhage in, **534,** 537.
hemorrhagic disease of, 38, 43, **99, 103.**
septic infection of, 90, 91, 103, **106, 109, 111,** 167, 534.
Noma, **628.**
Nose, **17.**
Noticing, 49.
Obstetric paralysis, **77.**
Omphalitis, **109.**
Orchitis, 324.
Orthostatic albuminuria, 442, **443.**
Osteogenesis imperfecta, **618.**
Osteomalacia, 618.
Osteomyelitis, 235, **297, 299,** 308, 565.
Osteoperiosteitis, syphilitic, **308.**
Osteopsathyrosis, idiopathic, **618.**
Otitis media, 133, 267, 278, 328, 342, **343, 345, 347,** 453, 562, 582, 625.
Ovarian cyst, 244.
Paralysis, examination for, **46.**
cerebral, 46, 77, 122, 125, 305, 508, 519, 526, 535, **537,** 555, 559.
diphtheritic, **557.**
Erb's, **560.**
facial, 77.
hysterical, **565.**
infantile, 77, 235, 444, 537, 546, **549, 551, 555,** 556, 557, 559, 560, 565, 569.
obstetric, **77,** 560.
peripheral, 235, 305, 537, **551, 555,** 556, **557,** 559.
Parasites, intestinal, 477.
Pasteurization (see infant feeding).
Pavor nocturnus, **498.**
Pelvis, characteristics of, **36.**
inflammation in, 248.
Pericarditis, 430.
chronic adhesive, **431,** 437.
dry, **426.**
with effusion, **423, 426.**
Periosteitis, 45, 235, **297, 299,** 565.
syphilitic, **308,** 565.
Peritonitis, 69, 111, 200.
chronic serous, 245.
malignant, 245.
septic general, 251, 373.
tubercular, 37, **245,** 248, **249, 251,** 285, 286.
Perspiration, 50.
Phimosis, 43.
Pigeon breast, **26.**
Pleural thickening, 252, 431.
Pleurisy, purulent, 381, 384, **385,** 388, **389,** 391, **392.**
serous, 251, 356, 380, **381,** 385, 394, 397, 398.
Pneumonia, 17, 33, 82, 133, 199, 267, 278, 279, 280, 282, 292, 293, 344, **369,** 373, **374, 377,** 380, 381, 384, 385, 390, 391, 392, 401, 419, 455, 540, 541, **543,** 562.
Pneumonia, acute tubercular, 384, 391.
physical signs in, **34.**
unresolved, 388.
Pneumothorax, **395.**
Poisoning, antitoxin, **606.**
bromide, 501.
lead, 593.
Poliomyelitis, 546, **549, 551, 555,** 556, 557, 559, 560, 565, 569.
Poliomyelo-encephalitis (see poliomyelitis).
Polycythemia, 405.
Polyuria, 615.
Pott's disease, 227, 235.
Prematurity, **63,** 91.
Proteids (see infant feeding).
Pseudoleukemia, 480, 486, **490,** 493, 586.
Pseudomasturbation, **511.**
Pulse, rate of, **29.**
rhythm of, **29.**
Purpura, 435, **592.**
abdominal, 592.
Henoch's, 592.
rheumatica, 592.
simplex, 592.
Pyelitis, 267, 442, **453,** 455, **456,** 589, 625.
Pylorus, position of, **38.**
spasm of, 38, **122.**
stenosis of, 38, 122, **125,** 528.
Pyonephrosis, 458.
Rales, **34.**
Rectum, anatomy of, **39.**
prolapse of, 40.
Reflexes, abdominal, **46.**
contralateral, **47.**
cremasteric, **46.**
plantar, **46.**
Respiration, bronchial, 33.
character of, **32.**
puerile, **32,** 33.
rate of, **32.**
ryhthm of, **32.**
Retropharyngeal abscess, 21, 301, **336,** 575, 579.
Rhagades, 17.
Rheumatism, 235, 297, **410,** 411, 414, 415, 416, **417,** 418, **423,** 425, 426, 427, 430, 551, 565, 604, 607, 624.
Rhinitis, diphtheritic, 17, 287, **288,** 301.
simple, 17, 287, 301, 326, 339.
syphilitic, 287, 301, **302,** 305.
Rickets, 15, 16, 19, 20, 25, 43, 44, 161, 190, 214, **224, 227, 232,** 253, 256, 260, 267, 282, 295, 305, 331, 339, 347, 472, 473, 522, 531, 566, 569, 573, 602.
fetal, 618.
Riga's disease, 19.
Rosary, **25.**
Saliva, **18.**
Sarcoma of brain, 563, 567.

Sarcoma, of kidney, 37, 238, 239, 445, **458.**
of liver, **397, 440.**
of lung, **398.**
of skull, **567.**
of suprarenal capsule, 440, 567.
of tibia, 308.
Scalp, veins of, **16.**
Scarlet fever, 133, 278, 292, 293, 314, 315, 317, **318, 321,** 377, 442, 480.
Sclerema, 50.
neonatorum, **93.**
Scurvy, 45, **236,** 238, **239,** 296, 299, 305, 469, 564, 624.
Sensation, **48.**
Septic infection, 415, 583, 589.
of new-born, 90, 91, 103, **106, 109, 111,** 167, 534.
Serum sickness, 606.
Sinuses, frontal, 22.
Skin, examination of, **50.**
color of, 50.
Small-pox, 310.
Smell, **17.**
Smiling, 49.
Spasmophilic diathesis, 47, 339, 508, 531, 532.
Spina bifida, 24.
occulta, 24.
Spleen, chronic endothelioma of, 494.
examination of, **41.**
position of, **41.**
tumor of, 630.
Splenomegaly, primitive, 494.
Standing, 43.
Starch (see infant feeding).
Starvation, 218, 241.
Status lymphaticus, 576, **583.**
Stethoscope, 27.
Still's disease, **621.**
Stomach, position of, **38.**
capacity of, **39.**
Stools, bacteriologic examination of, **61.**
blood in, **60.**
color of, **57.**
curds in, **59.**
in infancy, **54.**
membrane in, **60.**
microscopic examination of, **60.**
mucus in, **59.**
odor of, **57.**
of breast-fed infants, **54.**
of infants fed on artificial foods, **55, 56.**
pus in, **60.**
reaction of, **56.**
starvation, **56.**
Stridor, congenital laryngeal, **85,** 339.
Sucking pads, **18.**
Sugar (see infant feeding).
Suprarenal capsule, sarcoma of, 440, 567.
Sutures, 15.
Sweat glands 50.
Syphilis, 17, 18, 20, 43, 44, 48, **63,** 71, 79, 82, 90, 91, 94, 99, 103, 106, 119, 167, 218, 245, 287, 299, 301, **302,** 305, **306, 308,** 437, 486, 489, 493, 522, 529, 563, 565, 576, 615.
Tâches cérébrales, 48, 276.
Tactile fremitus, **34.**
Talking, 49.
Taste, 19.
Tears, 23.
Teeth, eruption of, **19.**
"Hutchinson," 20.
Testicle, undescended, 42, 43, 72.
Tetanus, 106, 531.
Tetany, 45, 47, 339, **531,** 532.
Throat, digital examination of, **21.**
examination of, **20.**
Thumb-sucking, 20.
Thymus, 27, 28, 30, 82, 579, 583.
cyst of, 576.
enlargement of, 85, 356, **575,** 576, **580.**
examination of, **35.**
Thyroid gland, 79.
Tongue, **19.**
Tonsilitis, 133, 278, 292, 293, 376, 586.
Tonsils, chronic hypertrophy of, **358.**
enlarged, 331, 575, 579.
Torticollis, 80, **604.**
Trousseau's symptom, **47.**
Tuberculin test, 218, 246, 254, 258, 286, 308, 364, 368, 381, 415, 437, 486, 489, 563, 586, 589, 630.
Tuberculosis, 18, 48, 254, 256, 263, 285, 286, 299, 308, 347, 408, 414, 453, 486, 489, 546, 563, 576, 586, 587, 589, 630.
acute miliary, 282, 414.
chronic diffuse, 169, 218, **261.**
family history of, 249.
history of exposure to, 249.
of brain, 563.
of hip, 235.
of kidney, 239, 445.
of lungs, **254, 256, 257,** 364, 367, 380, 381, 384, 391.
of lymph nodes, 245, 256, 260, 586, **589,** 630, 631.
of meninges, **264, 268, 271.**
of peritoneum, 37, **245,** 248, **249, 251,** 285, 286, 458.
of spine, 227, 235.
Tumor, of abdomen, 248, 285, 630.
of cerebellum, **563.**
of cerebrum, 563, 567.
of kidney, 630.
of spleen, 457, 630.
of testicle, 397.
of thymus, 576.
Typhoid fever, 251, 263, **279,** 280, 282, **283,** 285, **286,** 414, 452.
Ulcer of stomach, 493.

Urachus, patency of, 38, 94, 96.
Uremia, 270, 583.
Uric acid, 238, 239, 321.
Urine, amount of, **51.**
  characteristics of, **50.**
  in infancy, **51.**
  in the new-born, **50.**
Urticaria, factitious, 607.
Vagina, hemorrhage from, 43.
Vasomotor disturbances, **48.**
Voice sounds, **34.**
Vomiting, nervous, **127,** 130.
  recurrent, 127, **130,** 164, 444, 445.
Walking, 43.
Whey (see infant feeding).
Whey proteids (see infant feeding).
Whooping-cough, 249, 325, **326,** 364, 365, 367.
Worms, 169.
  pin-worms, **206,** 462, 511.
  round worms, **208.**
  tape worms, **210.**

Date Due

University of California
SOUTHERN REGIONAL LIBRARY FACILITY
405 Hilgard Avenue, Los Angeles, CA 90024-1388
Return this material to the library
from which it was borrowed.

DUE

RECEIVED 2000
SRLF CIRCULATION
APR 27 2000

Biomedical Library

PRINTED IN U.S.A. CAT. NO. 24 161 UN

UC SOUTHERN REGIONAL LIBRARY FACILITY
A 000 432 617 9

WS200
M885c
1913

Morse, John Lovett
Case histories in pediatrics..

WS200
M885c
1913

Morse, John Lovett
Case histories in pediatrics...

MEDICAL SCIENCES LIBRARY
UNIVERSITY OF CALIFORNIA, IRVINE
IRVINE, CALIFORNIA 92664